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Contents of this Issue

From the Editor's Window 5

Feature Articles—

Chicago Automobile Salon, by R. L. Masterson 17
Modern Furniture Styles; Austrian Examples, by La Vera Ann Pohl 21
Aircraft Finishing, by Anthony Stadlman 24
Show Window Fixture Finishing, by T. R. Nall 30
Color Problems in Wood Finishing, by The "Colorist" 33
Automobile Finishing Speeded Up, by K. N. Kathju 46
Drying and Hardening of Finish Coatings, by Fred Mannhardt 56
Finishing Airplanes, by S. M. Finch 64
Finishing Steel and Cast Iron Stove Parts, by W. R. Samuel 71

"Questions and Answers" Section 89

"New Materials and Equipment" Section 95

Improved "Explosion Proof" Ventilating Unit 95
Du Pont's New Yellow Dye 96
Self-Winding Time Switch for Circuit Control 96
Tornado Portable Electric Paint Sprayer 100
Improved Fountain Striper 103
Fillerub Improved 104

Editorial 114

Short Articles—

Hoops to Clamp and Hold Straining Cloths 20
Care of Paper Stencils 68
Installation of Dip Tanks 82
Smoothing Cast Iron Before Finishing 82
Dip Finishing Metal Box Linings 84
Lubrication Under High Temperature Conditions 84
Finishing Refrigerators 86
Refinishing Birch Mahogany to Walnut 91
Correction of Paint Formula 91
Another Acid-Proof Finish 92
Lacquer Sealers in Wood Finishing 107
How to Use the Spray Gun 111
Lighter Finishes in Vogue Again 116
Prefers All-Metal Interchangeable Turntables 116

"Classified Advertising" Section 118

Advertisers' Index 119

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From the Editor's Window

MANY A MOTORIST drives his car as long as it will go without attention other than to supply its bare necessities—gas, oil, water and air; and the nearer the time approaches when some adjustments, repairs or replacements will be necessary, or when neglect of such work will cause real damage, the more he pushes that car to "get all he can out of it before having it worked on."

Many industrial establishments have pushed production and sales so energetically that during the first nine or ten months of 1929 they did as much business as in all 12 months of 1928. But the break in the stock market and other factors influencing the recent lull in buying have caused activities in a number of industries to slow down. Some manufacturing concerns are "laid up for needed adjustments, repairs or replacements," in their own or in other organizations, but now is probably as good a time as any to get "tuned up" for 1930.

There will be just as many or more people to sell goods to in 1930, and they will have just as much or more money to spend—probably more because of the Government's promised reduction in income taxes, and because of the increase in large construction projects planned. Industrial establishments will need to be tuned up properly for quality production to satisfy the demands of 1930 buyers.

Factory executives are reminded that the compelling appeal of fine finishes and attractive decorations will probably sell a greater volume of goods in 1930, and now is the time to plan for those new designs and finishes—plan for quality first, then lower costs, and lastly speed or volume production if sales justify it.

W. H. Rohr

Managing Editor

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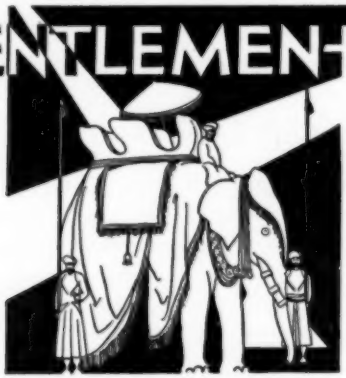

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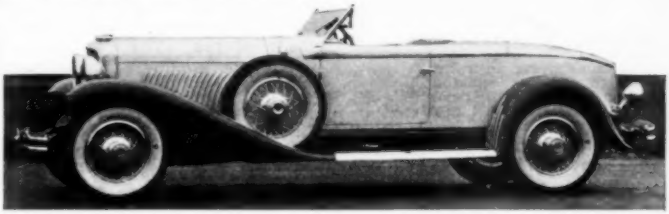


CHICAGO AUTOMOBILE SALON

Authentic and exclusive notes on the style, design, color and finish of custom coachwork exhibited on the latest fine cars of America and Europe

By R. L. Masterson

THE Annual Automobile Salon opened in Chicago at the Drake Hotel on November 9th and continued until November 16th. This was the 15th consecutive salon in Chicago.

Between 90 and 100 models created by the most famous body designers and builders in America and Europe were shown. Many of these exhibits will be taken to New York for the 25th Annual New York Automobile Salon which runs from December 1st to 7th inclusive. Several of them will also be exhibited at automobile salons to be staged in Los Angeles and San Francisco early next year.

These salons are an outgrowth of the original Automobile Salon which has been held in Paris France annually since 1898. They are dedicated to the display, amid suitable surroundings, of the most fashionable and meritorious custom coach work, mounted on the highest quality motor car chassis. In effect, the salons are custom-body-builders' shows where the best designers and builders of custom bodies display their latest creations.

The Chicago Salon of 1929 surpassed any of its predecessors; it embodied the supreme achievement of design, engineering and workmanship as executed in materials of the highest grade. Fifteen of America's most prominent custom body builders had special exhibits. These bodies were exhibited on ten of the leading makes of automobile chassis. In addition, three foreign and two domestic manufacturers of automobiles had special exhibits showing coachwork from their own shops mounted on chassis of their own manufacture.

At top of page: Duesenberg sport model; body by Murphy. Mouldings polished aluminum; body scratch-brushed aluminum. Fenders and chassis are in Cortez blue.

The list of exhibitors included the following well known firms:

Baker-Raulang	Judkins
Brewster	Le Baron
Brunn	Locke
Derham	Murphy
Dietrich	Rollston
Fisher	Weymann
Fleetwood	Willoughby
Holbrook	

The chassis on which the bodies were shown included:

Cadillac	Mercedes
Cord	Minerva
Cunningham	Packard
Duesenberg	Pierce-Arrow
Franklin	Rolls-Royce
Isotta Fraschini	Ruxton
La Salle	Stutz
Lincoln	

In strolling through this fashion show of motordom one was impressed with the fact that fashions are set by women of taste and social position. Upholstery fabrics and fittings were in many cases plainly designed to appeal to the feminine, and to blend with milady's latest costume. Color schemes, while not so flashy as a few years ago, were in complete harmony.

The apparent trend in custom body style seems to be a departure from straight, horizontal lines for varying degrees of parabolas and curves.

Stutz Black Hawk

As an illustration, a Stutz Black Hawk roadster, carries a sweeping curve from the radiator cap on top of the hood out to the edge of the cowl, thence backward and downward over half of the door and on down to the running board. This particular body was designed and built by Le Baron and is painted in a three-color combination of two shades of tan and a soft green. The panel on top of the hood and extending backward over the rear half of the door is in a dark tan shade. This same shade is carried out on the rear portion of the body including the rear deck.

The panel on the side of the hood and backward over the front half of the door is in a lighter shade of tan. The small panel, just above the louvres of the hood, created by the junction of the two curving panels of light tan and dark tan, is done in green. This same green color is repeated on a small rectangular panel at the top of either door and on the fenders. The radiator shield is in the darker shade of tan.

Duesenberg Sport Phaeton

Another rather striking model is a Duesenberg stream-line sport phaeton designed by Le Baron. This is a modification of the curved effect described on the Stutz Black Hawk roadster. The body is solid black. On top of the hood a gently-curving sand-colored panel starts at the radiator cap and widens out to the edges of the cowl. Here the panel becomes a rounded moulding about ¾-in. in width and continues back along the sides of the body near the top of the doors. On the doors the moulding widens to a panel 2 or 3-in. in width.

The moulding and panels are so built that they become lower as they advance to the rear of the car and thus create a decided effect of the front of the car being higher than the rear. This sand-colored moulding and panels accentuate the contour of the body and tie it together. Altogether the effect is one of extreme speed.

The fenders are in the same sand color as the panels and mouldings. A bright red stripe on the moulding matches the red leather upholstery. The wire wheels are chromium plated and the running boards are natural finished wood with chromium-plated protective strips, these

strips being repeated on the front and rear fenders where they join the running board.

In Uncolored Metal

Three bodies carried no colored lacquer on a part or the whole of the body. One of these was a Cadillac sport phaeton done in a very dark greenish gray all over, except for a curved panel on either side of the hood, which started near the radiator cap and curved backward and downward to the running board. These panels are of dappled design in the metal, produced by a revolving tool of some kind. One or more coats of clear lacquer cover the polished metal.

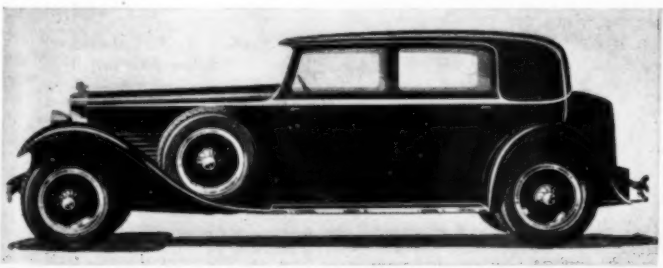
Another model on which the uncolored metal is allowed to show was a Duesenberg sport roadster, the body being built by the Walter M. Murphy Co. The top of the hood and rear deck are in polished aluminum. The sides of the hood and body are in a scratched or dull aluminum effect. The moulding is polished aluminum which serves to tie the front and back polished portions together. The wire wheels are chromium plated. The only finishing material on the entire job is that used on the black fenders.

The other body on which a portion of the metal is left uncolored was a sedan by Murphy mounted on a Duesenberg chassis. The body is done in solid black with no stripes or panels. The moulding running from the front to the rear is polished aluminum.

While many of the so-called sport models, of the open, closed or convertible type, are finished in two or more shades of one color, contrasts are played on some of the bodies. These sport models and the familiar town car type occupied the greater part of the show. Only a few of the very conservative, family type of cars were shown.

Black, Green, Blue, Maroon

One outstanding feature of the show, as contrasted to many previous automobile shows, was the prevalence of cars on which black or shades of green, blue or maroon (which were so dark as to be almost black) were used. Of the 95 bodies exhibited 25 percent were finished in black or very dark colors. Twenty of them were in black. Ivory is the prevailing striping color on these black jobs, although a few of them have iridescent gold or green stripes, apparently produced by the use of colored bronze powders.



Stutz sport sedan in black trimmed with chromium nickel and gold stripe in belt; a Weymann body.

Light blue, light green, silver, gold and red were also used for striping the black cars.

Next to black, various shades of green—most of them of a soft tone, and a few of a very dark shade—were present in greatest numbers. Over 20 percent of the cars shown were finished in the different green shades. Brown and tan shades were next in popularity, running about 15 percent of the entire exhibit. Maroon and gray jobs were about evenly divided, each of them making up about 10 percent of the show. Different shades of blue ran a close second to the maroons and grays. Two bodies were done in a considerable proportion of ivory.

Nitrocellulose Lacquer Finish

So far as could be ascertained all of the bodies were finished in nitrocellulose lacquer, with the exception of one or two of the polished or sanded aluminum jobs previously mentioned. All of the lacquered metal bodies were highly polished, rivaling the old fashioned clear varnish finish for luster.

Even on the Weymann-built fabric-covered bodies, of which there were seven exhibited, nitrocellulose lacquer was used to give colored effects. These bodies, of course, were not polished, but on some of them the lacquer had quite a high natural luster.

Hoops to Clamp and Hold Straining Cloths

To make a straining cloth easy and convenient to handle, I suggest the use of a pair of suitable sized flat hoops, the larger of which will fit around the smaller like a pair of crochet hoops. The hoops should fit together tightly enough to clamp the straining cloth (muslin, cheesecloth, etc.) securely, so that when the strainer is in service the cloth will not slip through the hoops. The cloth is not drawn across the hoops drum tight, but is allowed to bag down in the center so it will receive a reasonable quantity of the liquid material to be strained.

When the mesh of the cloth has become filled up and rendered useless from repeated strainings, the hoops can be disengaged and the old cloth can be replaced with new cloth quickly and easily. The outside hoop could be one with an opening in the rim and have suitable fittings to receive a thumb screw for expanding or contracting it. The size hoops to use for cloth strainer rims will be governed by sizes of receptacles paint is being strained into.—M. V. Leach.

New Metal Finish by Hilo

A new product developed by Hilo Varnish Corp.—Machine Tool Builders' Association Standard Gray—is just being introduced to the trade. M. T. Standard Gray is furnished both in enamel and in lacquer. Metal plates of both enamel and lacquer showing color and luster, will be sent to interested manufacturers on receipt of request.

Leaves U. S. Laboratory Joins DuPont

Ervin F. Kurth, chemist in the section of Derived Products at the U. S. Forest Products Laboratory, Madison, Wisc., left the laboratory November 1 to join the DuPont Co. at Wilmington. Mr. Kurth graduated from the University of Wisconsin in 1927 and joined the Forest Products Laboratory shortly thereafter.

Mr. Kurth will be assigned to the methanol research section of the E. I. duPont de Nemours & Co. laboratory at Wilmington, Del., and later will be sent to one of the southern or eastern plants.

Modern Furniture Styles; Austrian Examples

Industrial Finishing's Specialist in colorful modern art and design, traveling in Europe, submits interesting notes, ideas, suggestions and sketches of the latest furniture styles as observed in European capitals

By La Vera Ann Pohl

AUSTRIA, particularly Vienna, offers to the student of modern furniture design and finish, a large field—a field full of variation and interest that commands immediate attention. In Vienna such names as Ludwig Hoss, Hoffmann, Dr. Weiser, and Sobotha of Budapest, are full of meaning and the meaning is *Modern furniture artistry*. These men know furniture design, color and finish. They study and create that which reaches a high point in the artistic sense.

Austrian furniture has a quality of its own, just as has the French and German modernistic product of today. The fundamental principles adhere to the great principles of "Modern Line," but a catchy idea here or there makes or gives it a characteristic which calls itself *Austrian*. The characteristic is a certain appearance of *fullness or roundness*—not in every article, to be sure, but in a sufficient number to say that it is the general characteristic.

One can note this inclination to roundness or the "swell line," as it is rightly called in Fig. 1. The sofa—a soft sea green with darker green welting and stitching—is interesting in its effect of fullness of surface. Each individual cushion effect strikes the same note. This sea green sofa, with its darker note, has a transparent wood trim—a beautifully grained curly maple, rubbed up in a transparent deep emerald green and lacquered. Only by very close inspection does one realize that the wood has a grain and is polished. The effect is such that when the lights play upon it the surface appears to be made of mirrors, so perfect is the lacquering and polishing.

The *curly maple* is the only reference to added decoration; it takes the place of decoration.

Fig. 1—This sofa has heavy satin upholstery material in soft sea green, with darker green welting and stitching. The wood is curly maple lacquered and polished to a mirror finish.

The upholstery material is a heavy satin of about medium gloss. It might appear that the sofa is hard, but on the contrary, it is generously comfortable and as luxurious as a down cushion can be.

The table—for tea, coffee or other refreshments—illustrated in

Fig. 2—A man's chair; low seat, high back, massive proportions, characterized by rotundity.

Fig. 1, is made of metal. It has a removable top and is really a general convenience in any household. It is a table commonly used in Europe and is considered an essential accessory table.

There are various finishes used, just as there are various metals employed, but the favorite color is orange red or tones of blue green and gray, also aluminum lacquered to a high polish effect. These tables are never decorated beyond the scalloped or "pie crust" edge, which is always turned up to form the rimmed tray necessary for the tea service. The table stands solidly on all fours; it is sturdily built and easily managed.

Another typical Austrian viewpoint in design is revealed in Fig. 2, which shows a man's chair of generous low proportion with a high back and covered with a heavy striped satin or linen. The stripes are interestingly treated in their general arrangement on the chair. The arms are also covered. The complete back continues this progressive roundness of line; and notice how the top is cut with three generous round waves or arches to exaggerate the entire general impression. The shaped arms complete the picture of rotundity. This chair is generally built up in colors such as soft tans and browns plus a bit of Venetian black and orange. It makes a welcome addition to the gentlemen's quarters.

A tea cart of remarkable simplicity, yet dignified in its conception of design, appears pictured in Fig. 3. It has unusual lacquer treatment in that the top of each shelf is a high brilliant luster while the bandings and bottoms of the shelves are extremely dull. A white or silver line forms the only decoration. This line is applied about 1½-in. from the edge of each shelf, and it is about ¼-in. wide. The wheels are made of solid wood.

Two kinds of wood could be used in the construction of this cart—a curly maple for the shelf tops, slightly grayed, and an African nutwood in almost pitch black. With this combination the silver decorative line should be eliminated inasmuch as the combination of two colors in such sharp contrast is all the decoration re-

Fig. 3—A tea cart of all wood construction, simple in style, useful and capable of attractive decoration.

quired. Notice also that the top is one which can be opened out to form quite a sizable table—an excellent idea for hotel and apartment-house furniture, or for a small compact home.

In all furniture of modern design, consideration is always given to the practical (utility) side as well as to the artistic objective. Today, I find few sofas in which both ends are built up or which have so-called arms. Sofas are becoming more and more comfortable and more easy to manage. The example shown in Fig. 1 strikes a high note in this effort to consider every reason for its being. It represents an original and unusual conception in the height of modernity.

Modern furniture is already losing its extreme national classifications and influences in design, although one can trace directly the immediate influence of its designer and nationality. Today *Modernism* has a wider international scope. It remains to be seen what the American manufacturers will do in influencing the designs of today. In all probability, from what can be seen now, they will add to instead of detract from it.

Experienced finishers have acquired a respect and "open mindedness" for the developments of new materials, processes and equipment.

Zapon's Cleveland Branch Moves Into New Office Building

The Cleveland Branch of the Zapon Co. (Stamford, Conn.) has just completed a new modern office building located at 8312 Bessemer Ave. Space formerly occupied by the office in the the general warehouse will be converted into a laboratory. The Cleveland branch is in charge of W. J. Terpenny.

Oakite Sales Conference

The 110 District Managers and Representatives comprising the field organization of Oakite Products, Inc. met in the general offices in New York from November 20th to 23rd, on the occasion of their 21st Year Annual Sales Conference.

Every section of the United States and Canada is represented by this organization, so that the daily discussions covered every conceivable kind of cleaning work. Among the papers read were those referring to Paint Removing, and Cleaning Steel for Porcelain Enameling. There was ample opportunity for exchange of ideas on all subjects relating to cleaning. This was augmented by special laboratory demonstrations made by the office Technical and Laboratory Staff, as well as by those men who have made certain fields their special study.

Oakite Products, Inc. takes a similar opportunity every year to acquaint each of its men with every improvement in cleaning equipment and cleaning methods, so that everyone is equally qualified to handle effectively any cleaning problems submitted.

AIRCRAFT FINISHING

Veteran Aeronautical Construction Engineer, Pilot and Aviation Enthusiast, writing exclusively for Industrial Finishing Magazine, explains the requirements of aircraft finishing and submits details of recommended cleaning and finishing procedure

By Anthony Stadlman

IN THE MANUFACTURE of airplanes, one of the most important phases of production is the selection and application of the proper paints, lacquers, varnishes, oils and other similar protective and decorative materials.

The airplane of today, finished in beautiful shades of various colors, must not only appeal to the eye of the prospective purchaser, but it must also give him lasting service and retain its beauty and strength after he buys it and uses it. For that reason the finishing materials used in aircraft production must possess many other good qualities besides beauty of color—among them being the retention of flexibility under actual service conditions; this is all-important.

The protective coat of paint must be impervious to the destructive rays of the sun, must be unaffected by sudden changes in temperature and indifferent to rain and snow. It must yield, stretch, shrink and withstand constant vibration without checking, chipping or peeling off, and it must not open any fissures—no matter how hard all the parts are working—that would permit the destructive action of corrosion and disintegration to set in.

Manufacturers of paints and finishes are continually striving to develop their products to satisfy the special requirements of aircraft; they are conducting research work and experiments the object of which is to bring out, if possible, better and more

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At top of page: The "Yankee Doodle"—the plane that earned a national reputation . . . . and carried Col. Arthur C. Goebel safely across the continent in the 1928 National Aeronautic races . . . . Stadlman's (the author's) masterpiece of aircraft construction.

durable finishing materials and protective coatings, particularly for plywood-covered surfaces and for machines built of aluminum alloys. It is up to the aircraft manufacturer to select the proper finishing materials to suit his special needs and to adapt and develop equipment and proper methods for applying these materials to the numerous parts of aircraft structure.

Modern Methods

I believe the methods of finishing now used in various aircraft factories are as efficient as they possibly can be under the circumstances. When we consider that airplanes are not being produced in very large quantities and that the industry itself is in a very transitory stage as to the designs, types and materials used, we cannot be surprised when the well developed and efficient finishing methods of today, may be found inadequate and impractical tomorrow.

Aircraft paint and finishing shops, together with the equipment necessary for the application of finishes, are not much different from many of the automobile finishing shops, except that larger floor space and roomier spray booths are required for aircraft finishing on account of the bulkiness of various airplane units, such as wings and fuselages.

Use of highly volatile liquids and solvents in aircraft finishes requires efficient ventilation to keep the paint shop clean and clear of injurious and combustible vapors. The shop also must be properly heated during cold weather, as the majority of finishes refuse to set and dry unless the shop is warm. Lacquers are very sensitive to cold and will shrivel up or show an orange peel texture if applied during a cold spell in an unheated shop.

Cleanliness; Electrical Hazards

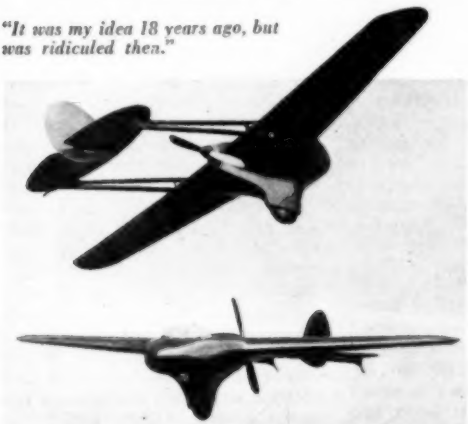
Rules of cleanliness and order should be strictly enforced in every aircraft finishing shop. Accumulations of dust in the corners and on the beams, rafters and other exposed parts of the factory structure may result in a spontaneous combustion and fire. Soiled cleaning rags and waste saturated with linseed oil or other finishing liquids—these carelessly thrown about the shop are responsible for a great number of disastrous fires. Worn or damaged electric extension cords are a frequent source of fire. Really the use of electric light extensions and appliances requiring extensions and appliances requiring extension cords should be discouraged.

To eliminate this particular kind of fire risk, we have adopted pneumatic hand tools for sanding, smoothing and polishing operations. A sprinkler system and properly constructed fire walls, equipped with automatic fire doors, will isolate and protect the rest of the factory buildings against the spread of any fire that might originate in the finishing department.

Modern Equipment

Modern equipment and experienced finishers are of prime importance in any finishing shop, as it requires expert handling of the finishing materials to bring out the good qualities of such materials. I believe in using high-grade spray guns, air filters, air and material hose, material containers for suction and pressure feed, hose cleaners, etc., because we know these are successful in our shops.

"It was my idea 18 years ago, but was ridiculed then."



A radical departure in aircraft construction. Two views of model of new type airplane which the author has designed and is building in Los Angeles. The fuselage is eliminated by substitution of open frame or outriggers to carry the stabilizing and controlling surfaces at rear end. Wing thickness is increased to enclose engines, cargo and passengers; a "pusher" type.

Brushes are not used very much, except for the application of the first coat of pigmented dope to the fabric-covered wings and fuselages. This work requires skillful handling of the brush, as it is essential that the first coat saturate the fabric thoroughly—and the operator must be able to accomplish this without stretching the fabric surface by excessive pressure on the brush. Before the application of the first coat, the fabric must be carefully inspected; if any oil or grease spots are discovered, these must be removed with lacquer thinner; otherwise the coating of dope will blister and flake off.

The following three coats are applied by spray gun, as this method is more efficient and makes the surfaces drum tight. Hand brushing, even if skillfully performed, is slower and tends to make the fabric flabby. The resulting sprayed finish is semi-glossy in appearance; if a high-gloss is desired, an additional application of special colored aircraft-finishing lacquer is necessary. There are numerous good aircraft-finishing lacquers available; in my experience the products of two concerns advertising in INDUSTRIAL FINISHING magazine have been used with the very best results.

Plywood Finishing

The finishes and the method of application, as used by us in the finishing of plywood-covered wings and plywood or monocoupe fuselages, are different than those used on fabric-covered surfaces. After the plywood is smoothed with suitable abrasive paper, a priming coat is applied with a spray gun. Over this priming coat we spray an oil surfacer, which is then sanded down. Then we spray on a second application of primer, this being a very thin coat. This second application of the primer is necessary to cover the heads of brass nails and screws, which were exposed by sandpapering.

The surfaces are now ready to receive from three to five coats (all depending on the opaqueness of color) of a product* especially suitable for finishing aircraft plywood. This product can be had in

*Name on request.

Bringing to the manufacturer . . . . . greater economy

The New and Improved

SANDING SEALER No. 2550

by

ZAPON

Costs less than shellac—not a substitute . . . .
Although priced considerably lower than a good grade of shellac, the new and improved Zapon Sanding Sealer No. 2550 is not a substitute for it.

Cuts cost of sanding and drying . . . . . .
Zapon Sanding Sealer No. 2550 is a high-grade pyroxylin lacquer sealer developed for manufacturers who want a sealer that will fill the pores perfectly with one coat, cut sanding costs in half and dry in one third the time that it takes shellac.

Seals perfectly — will not bleach fillers . . . .
One spray coat of Sanding Sealer No. 2550 has sufficient body to seal and level perfectly. It is absolutely free from any grayish cast and gives perfect adhesion.

Sprays easily, the best base for lacquer . . . .
This new and improved Zapon Sanding Sealer No. 2550 sprays freely—more easily than shellac. It is the best base for lacquer. Does not contain any benzol or wood alcohol.

Test these statements at our expense! . . . . .
A generous sample of Zapon Sanding Sealer No. 2550 will be shipped prepaid upon request so that you may test these claims in your own plant in any way you wish. We know from the experience of other high-grade furniture manufacturers, that a test will also convince you of the all-round superiority of this new and improved Zapon Sanding Sealer No. 2550.

Send for a generous sample today . . . . . .

THE ZAPON COMPANY, STAMFORD, CONN.

great variety of colors. The above described procedure gives a beautiful finish which is not only pleasing to the eye but which is also very serviceable.

In the plywood-covered wings and fuselage structures, it is important to protect the plywood against excessive moisture not only from the outside, by the use of the colored lacquers, but also from the inside of the structure. For this purpose we use another material—one that affords a high degree of protection against the penetration of moisture and which retains its flexibility through all the extremities of service and weather.

Treating Steel Tubing

Steel tubing fuselages require thorough treatment with the finishes that are effective in protection against rust and deterioration. Every tubular member of the structure must be treated not only on the outside, but on the inside surfaces as well.

To prepare the fuselage for treatment, holes (about 1/16-in.) are drilled at each end of every tube, and the scale on each welded joint is removed by vigorous brushing with a steel brush. If this scale is not completely removed, it will in time flake off with the protective coating, and this will expose the metal to the destructive action of rust at vital points of the structure.

The fuselage is then suspended in supports that will permit it to be rotated around its longitudinal axis, and it is clamped fast when some of the tubes are in vertical position. Hot linseed oil (or other effective material) is then forced by pressure into the vertical tubes, through the small drill hole at the bottom of the tube, until it starts to flow out from the hole drilled at the top end. The upper hole is then plugged up with a wooden plug and the oil injector nozzle is withdrawn from the lower hole which then is also plugged up.

After one set of tubes are filled in this manner, the fuselage is turned until the tubes next to be treated are in a vertical position; the process of treatment is repeated until all the tubular members of the fuselage are filled. Then the wooden plugs are withdrawn and the liquid is drained off into a large drip pan from which it flows into removable containers to be used over again. The 1/16-in. holes are permanently sealed up with driving rivets or soldered up to seal the interiors against the entrance of moisture.

Fuselage Exterior

The outside of the fuselage is thoroughly cleaned with lacquer thinner and, after all the suspicious and rusty spots are removed with the aid of steel brush or emery cloth, two coats of metal primer are applied for outside protection.

Sheet dural requires anodic oxidation treatment before finishes can be applied. Some steel parts of aircraft must be sandblasted and electroplated before painting; and castings of steel, dural and aluminum must be properly prepared to receive their protective coating of aircraft finishes.

Paasche Cleveland Branch News

The Paasche Airbrush Co., announces an increase in the personnel of its Cleveland branch. H. V. Schweitzer and J. G. Newman have been added as salesmen. Mr. D. Bordoe-Nielsen continues as Branch Manager. A larger sales and display room has been opened at 722 Perry-Payne Bldg., telephone Main 5560. A complete stock of equipment will now be maintained at this new address for quick service to the many Paasche customers in this territory.

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Show Window Fixture Finishing

Foreman Finisher's notes on the design and finish of woodwork in a diamond store display window; how the diamond matched veneering and hand - carved woodwork were finished

By T. R. Nall

WHAT is said to be one of the most elaborate store fronts of its kind, was manufactured and erected some time ago by our company for Will Sales' jewelry establishment at Fourth and Liberty Sts., Louisville, Ky.

The display features of the front are built-in to form a part of the building itself. The solid bronze and Italian marble front is lighted by red, blue and green Neon lights and a border of white frosted lights. The letters of the nameplate are outlined in bronze with red Neon tube lights in them, and the store's slogan, "Diamond Store of Louisville," is in bronze with blue tube lights. The border of the name and slogan is in green tube lights. The background with decorative effects, is of bronze with a bronze fan effect over the door. Above the door is a silhouetted lighting effect in etched glass, with gold damask draperies.

The background of these windows is a remarkably attractive display of hand-carved French walnut and beautifully-veneered paneling installed by "R. Mansfield & Sons."

French Walnut Woodwork

In designing this woodwork to be in keeping with the diamond show window, the shape of the panels and their finish had to be considered. The veneers are matched to a diamond shape and each veneered panel is set in a rectangular frame something after the manner in which small window panes are positioned in sash. After these panels were placed in the frames, they formed big panel units about 7-ft. high by 6-ft. wide. Several of these panel units are joined together to form the background for the show window.

The arched top sections of each of these panel units are composed of hand-carved French walnut. This carving was done by skilled hand carvers at the rate of about 1-sq.ft. per eight hours. The company hired eight carvers for this job—and it was no easy task to

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find that many good carvers in our city—on short notice.

Finishing the Carvings

In the finishing of carvings, I might suggest that the first thing a skilled finisher learns about finishing carvings is that he should never use several coats of gloss varnish or filler on carved surfaces: also, that he should not rub carved surfaces like he rubs other surfaces. Thick varnish coats, etc., fill up the depressions. Rubbing, rounds off or cuts away the sharp edges of the carvings and these sharp projections are the distinguishing marks of clean-cut, skillful carving. High-class carving should not be marred or ruined by the finisher. My plan is to give the carvings a very thin coat of shellac to seal up the porous edge grain to prevent it from absorbing too much stain. If there is any filling to be done, *fill up to the carving, but do not put any filler on the carvings.*

The finish is as follows: Light French walnut is obtained by using a light brown filler—almost natural. Fill the panels up to the carvings, being sure to avoid getting any filler on the carvings. Then shade with light brown shading stain around the edge of each diamond panel, to make the diamond shape more pronounced.

White shellac is then sprayed on all over the panel including the carvings. Steel wool is used to sand the flat surfaces, because if one used sandpaper it would pick up the shading stain. Use a dry stiff brush to hit carvings to knock off any roughness. Spray on two coats of gloss lacquer, allowing time between coats for proper drying. Use masking material on the flat surface around the carvings. Then spray flat lacquer on the carvings. After the flat lacquer is dry, clean off the masking material (using clean water) and then oil rub the flat surface.

Now we have the same effect on the flat surface and the carvings. By this method the sharp edges of carvings are not dubbed off nor cut off; the carvings are left clean and they match up with the flat surfaces. And one doesn't see any filler or pumice stone in the carvings, as we see on some furniture after it has been out of the factory a short time.

Finishing the Floors

The floors of these show windows are of hardwood inlaid with a black walnut border. These floors are filled with the same filler as the panels. After filling, the floor is given two coats of white shellac and then sanded to a smooth surface and waxed to give durability.

These windows are lighted with reflectors and spotlights that give a variety of colors and attractive effects.

The all-metal door is of German silver and bronze; it is the first door of its type installed in this part of the country. A solid bronze lantern hangs in the doorway. The circular vestibule has a floor of marble worked into a star design in different colors.

Air Heaters and Dryers

The Gehnrich Oven Co., (industrial ovens) 35th St. and Skillman Ave., Long Island City, N. Y., has published a new bulletin on the Gehnrich industrial heaters, indirect gas-fired, for airdrying paint and varnish finishes and for other uses of industry. The bulletin is a four-page supplement and can be placed in a standard 8½ x 11-in. loose-leaf binder for ready reference. It is printed on coated paper in two colors and illustrates the air heaters, including views of 8 Gehnrich installations in industrial plants.

"This article on Color Problems is the result of arduous and careful laboratory work. I believe it will provide a world of information for the color chemists, mixers, and various technicians engaged in the wood-coloring industry."—The "Colorist."

Color Problems in Wood Finishing

A summary of the properties of the dye groups, from which wood stains are made, with data relative to the reactions of important dyes to weak and concentrated acids and alkalis

By The "Colorist"

WOOD FINISHERS and color mixers have at various times found themselves in distressful situations due to the fact that they were not fully acquainted with the properties of the stains they were employing. I am acquainted with one case where a color mixer in attempting to brighten the shade of acid orange added auramine to the staining solution. Instead of obtaining the rich, bright orange he was expecting, he was the recipient of a cloudy solution which was valueless as a stain. If the color mixer was aware of the fact that auramine was a basic dye, and that basic and acid dyes precipitate one another from solution, he could have avoided this waste of time and material.

In this article I shall endeavor to summarize the properties of the dye groups, give the reactions of the important dyes to weak and concentrated acids and alkalis. I shall also discuss points of interest in each group.

General Properties of Acid, Basic, Colors and Earth Soluble.

1—Acid dyes are faster to light than basic colors but the fugitive basic colors possess greater coloring strength than the acid dyes.

2—Basic dyes are generally classed as "alco-soluble." This is true with the exception of Methylene Blue, Safranine and Napthol Blue. The aforementioned dyes are only sparingly soluble in alcohol. Acid dyes as a class are insoluble in alcohol. Some of the acid colors, such as Metanil Yellow, Wool Green, Napthol Blue-Black and a few others are fairly soluble in alcohol. By means of grinding and constant stirring the said dyes may be made soluble up to 1% (approximately 1-lb. of dye to 12 gallons of alcohol).

3—Basic dyes are precipitated from solution upon the addition of tannic acid. The tannin forms an insoluble lake with the color. This lake can be redissolved by the addition of oxalic or tartaric acid.

4—Basic colors when mixed with acid or earth soluble dyes form an insoluble precipitate.

5—Earth soluble colors are very fast to light. They are precipitated

from solution upon the addition of acid or alum. They should never be shaded with basic colors as precipitation follows immediately. These solar fast dyes may be readily shaded with acid colors without any deleterious results.

In determining the reactions of the dyestuffs to 10% sulphuric acid, 10% sodium carbonate, hydrochloric acid concentrated, and 10% sodium hydroxide, the following method was employed. A filter paper was dipped in a staining solution of ¼% strength (approximately 4 oz. of color to 12 gallons of solvent). The colored paper was dried by means of suspending it over a hot plate. Each reagent was applied by allowing a drop of the acids and alkalis to fall on the colored paper. The reaction of the dyestuff to the acids and alkalis was noted from the point of application, till the drying of the reagent on the stained filter paper. It will be noted that sodium hydroxide affects or destroys practically every dye. This fact does not necessarily indicate that the stain is not alkali-proof. It is my belief that if a dye can withstand the action of 10% sodium carbonate, the color can be classed as alkali-proof.

Note: Alkali turns the filter paper a yellow shade; this point must also be considered in our determinations.

The following data shows the reaction of dyes to the acids and alkalis specified:

Yellows; Acid Group

Napthol Yellow

10% sulphuric acid.....color fades completely.
10% sodium carbonate.....practically no change.
Hydrochloric acid conc.....color fades completely.
10% sodium hydroxide.....color fades to light brown.

Tartrazine

10% sulphuric acid.....practically no change.
10% sodium carbonate.....color fades a trifle.
Hydrochloric acid conc.....color fades almost completely.
10% sodium hydroxide.....color fades to a dull grayish brown.

Metanil Yellow

10% sulphuric acid.....color turns a deep violet.
10% sodium carbonate.....no change
Hydrochloric acid conc.....color turns a deep violet.
10% sodium hydroxide—.....color fades to half of the original strength.

Milling Yellow

10% sulphuric acid.....color turns bright red.
10% sodium carbonate.....no change.
Hydrochloric acid conc.....color changes to a bright red.
10% sodium hydroxide.....color fades practically completely.

Yellows; Basic Group

Auramine

10% sulphuric acid.....color fades completely.
10% sodium carbonate.....color fades practically completely.
Hydrochloric acid conc.....color fades completely.
10% sodium hydroxide.....color fades completely.

Now let us employ the above tabulation of reactions. For example, we had a bright yellow staining solution with whose contents we were not familiar. The stain appeared to be auramine but upon close examination we discovered that the solution was also similiar to *napthol yellow* in shade and general appearances. To find out which of the two colors the stain solution was representative

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of, we would employ the following procedure:

Knowing that auramine and *napthol yellow* react similarly to acid, we immediately discard that point. We then proceed to dip a piece of filter paper into the stain.

Orange; Acid Group

Acid Orange Y.

10% sulphuric acid.....color turns red.
10% sodium carbonate.....practically no change.
Hydrochloric acid conc.....color turns red upon direct application of the acid but upon volatilization of the reagent the color returns to its original shade.
10% sodium hydroxide.....dye turns a dull brown-red.

Orange; Basic Group

Chrysoidine

10% sulphuric acid.....color changes to a dull brown.
10% sodium carbonate.....color turns a bright yellow.
Hydrochloric acid conc.....color turns red-brown upon direct application of the acid but when the acid drys the color returns to its original shade.
10% sodium hydroxide.....color turns yellow.

The colored paper is dried; sodium carbonate and sodium hydroxide are applied. If the color is auramine, the paper will turn white at the points of application, but if the stain is *napthol yellow*, the sodium hydroxide would turn the paper a light brown and the effect of the sodium carbonate would be nil.

Let us assume that the stain gave the reactions for auramine. We could confirm its being the said color by the addition of tannic acid to a small portion of the solution. If our assumption is veritable, the auramine should be precipitated from solution.

Some skeptic would say "Well, why trouble with all that work?" I can readily appease him with the following answer. Let us assume that the color-mixer used the solution in question in the staining of some toys which were required to be fairly fast to light. If he was able to determine what color he was employing, he would never under any circumstances have used the fugitive auramine as a fairly fast to light stain. He would instead have used *napthol yellow* or *tartrazine* which would answer the aforementioned requisite. It pays, to know the properties of the stain that you are employing!

Note: It will be noticed that upon the direct application of hydrochloric acid a color change is affected. Due to the volatile nature of the reagent, the dye usually returns to its original shade after a period of time. Hereafter, in giving the reaction of the dye to this reagent, I shall only record the change which takes place immediately after application of the hydrochloric acid.

If we were to make an orange wood novelty, which was to be topped with a casein finish, we should find the above information of good value. Knowing that casein is dissolved by means of alkaline action, we would have to employ a dye which is fairly fast to alkali. Referring to our list of reactions, we there find that acid orange answers the said requisite. A wood colored with chrysoidine and topped with an alkaline glue or adhesive shows stripes due to the fact that the penetration of the alkaline paste changes the color on the wood.

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Red; Acid Group

Lake Scarlet

10% sulphuric acid.....turns shade a trifle bluer.
10% sodium carbonate.....practically no change.
Hydrochloric acid conc.....turns color a trifle bluer.
10% sodium hydroxide.....color fades to a light yellow.

Croceine Scarlet

10% sulphuric acid.....color turns blue-black.
10% sodium carbonate.....practically no change.
Hydrochloric acid conc.....color turns blue-black.
10% sodium hydroxide.....color turns blue-black.

Azo Rubine

10% sulphuric acid.....color fades to a yellow-brown.
10% sodium carbonate.....practically no change.
Hydrochloric acid conc.....color reacts same as to sulphuric acid, but upon volatilization of the acid, the color returns to original shade—one half strength.
10% sodium hydroxide....color first turns yellow-brown but upon drying of the reagent, the dye returns to original shade.

Red; Basic Group

Fuchsine

10% sulphuric acid.....color turns yellow.
10% sodium carbonate.....color fades slightly.
Hydrochloric acid conc.....color first turns yellow, but upon volatilization of the acid, the color turns violet-blue.
10% sodium hydroxide.....color fades almost completely.

Note: Fuchsine is very sensitive to acid. The weakest of acids will dull the shade appreciably.

Safranine

10% sulphuric acid.....color turns deep blue.
10% sodium carbonate.....practically no change.
Hydrochloric acid conc.....color turns a deep blue.
10% sodium hydroxide.....color changes to a dull red-brown.

Rhodamine, Blue Shade

10% sulphuric acid.....turns color orange-yellow.
10% sodium carbonate.....color fades almost completely.
Hydrochloric acid conc.....turns color an orange-yellow.
10% sodium hydroxide.....destroys color completely.

Rhodamine, Yellow Shade

10% sulphuric acid.....turns color orange-yellow.
10% sodium carbonate.....color fades slightly.
Hydrochloric acid conc.....turns color orange-yellow.
10% sodium hydroxide.....color turns a yellow-brown.

Note: It will be noted that Safranine and Rhodamine Y. S. offer fair resistance to sodium carbonate. This does not mean that the reagent may be added directly to a staining solution of the said dyes. Such action would be destructive to the solution. When sodium carbonate or hydroxide is added to a basic color solution, the color base is precipitated. This precipitate may be re-dissolved with the aid of acetic acid.

Brown; Earth Soluble, Brown Land D.

These colors appear to be little harmed by the action of 10% sulphuric acid or hydrochloric acid conc. The alkalis have a solvent effect on the colors causing them to run on the filter paper. Earth soluble browns are classified as alkali-proof.

Brown; Basic Group

Bismarck Brown

10% sulphuric acid.....color darkens.
10% sodium carbonate.....color fades towards a yellow.
Hydrochloric acid conc.....same as sulphuric acid reaction.
10% sodium hydroxide.....color turns yellow.

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Brown; Acid Group

Resorcine Browns

These colors are rarely used due to their prohibitive cost. More economical browns can be made by mixing Acid Orange, Metanil Yellow, Azo Rubine, Napthol Blue-Black, and Nigrosine. The reactions for the latter colors are found under their respective groups.

Green; Acid Group

Wool Green

10% sulphuric acid.....color fades to a yellow-orange.
10% sodium carbonate...turns the shade blue and causes a slight fading.
Hydrochloric acid conc.....color turns a yellow-orange and then fades completely.
10% sodium hydroxide.shade turns blue and then fades almost completely.
10% sodium carbonate.....color fades entirely.

Acid Green G.G.

10% sulphuric acid.....color fades to orange.
10% sodium hydroxide.....color fades entirely.
Hydrochloric acid conc.....color turns orange, then fades completely.

Napthol Green

This dye is very sensitive to acid. Sulphuric and hydrochloric acids cause the color to fade completely. On the other hand, this dye is extremely fast to alkali. Sodium carbonate and hydroxide effect no change when applied to this alkali-proof green.

Note: Wool Green is the bluest of the above acid greens. Acid Green G.G. is next in line. Napthol Green is the yellowest and possesses the weakest tinctorial power.

Green; Basic Group

Malachite Green

10% sulphuric acid.....color turns orange.
10% sodium carbonate.....color fades completely.
Hydrochloric acid conc...color turns orange then fades almost completely.
10% sodium hydroxide..color turns white upon immediate application of caustic reagent.

Violet; Acid Group

Acid Violet 4BN

10% sulphuric acid.....color fades to a pale yellow.
10% sodium carbonate.....color fades slightly.
Hydrochloric acid conc...upon direct application of reagent, color turns yellow.
10% sodium hydroxide.....color fades completely.

Violet; Basic Group

Methyl Violet 5B

10% sulphuric acid.....color fades to a pale yellow.
10% sodium carbonate.....color fades to one half original strength.
Hydrochloric acid conc.....color turns yellow.
10% sodium hydroxide.....color fades entirely.

To distinguish between basic and acid violet the following method is employed. To unknown solution add a small quantity of tannic acid. Basic violet will "lake out" while acid violet will remain intact.

Blue; Acid Group

Patent Blue

10% sulphuric acid.....color turns yellow.
10% sodium carbonate.....color fades slightly.
Hydrochloric acid conc.....color turns yellow.
10% sodium hydroxide.....color fades to a dull blue.

Note: Patent Blues are very sensitive to acids. The weakest of acids will cause the shade to go greener.

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Blue; Basic Group

Methylene Blue

10% sulphuric acid....color changes to a pale green blue and then fades almost completely.
10% sodium carbonate.....shade changes to a green blue.
Hydrochloric acid conc...color goes greener and then fades almost completely.
10% sodium hydroxide.....color fades to a pale red-brown.

Victoria Blue

10% sulphuric acid.....color turns bright orange.
10% sodium carbonate.....color turns brownish-black.
Hydrochloric acid conc.....color turns orange.
10% sodium hydroxide.....color turns orange-brown.

Black; Acid Group

Nigrosine Blue W.S.

10% sulphuric acid.....turns shade a trifle greener.
10% sodium carbonate.....color turns red-brown.
Hydrochloric acid conc...color goes a trifle greener, and fades slightly.
10% sodium hydroxide.....color turns a yellow-brown.

Napthol Blue-Black

10% sulphuric acid....shade goes greener color, loses ½ tinctorial power.
10% sodium carbonate.....practically no change.
Hydrochloric acid conc..shade goes greener, color strength is greatly reduced.
10% sodium hydroxide.....color turns violet.

Note: The above color is of a navy blue shade. When shaded with Acid Orange Y. it gives a very jet and soluble black stain.

Black; Basic Group

Spirit Nigrosine

The reactions for this dye are similar to that of nigrosine W. S. This dye is only soluble in spirits.

Basic Black blends usually are made by mixing Brown, Green, and Violet until the desired shade is received.

In concluding this article, I wish to emphasize the importance of knowing the properties of the colors enumerated. I sincerely believe if the consumer familiarizes himself with the general properties of the dyes employed, he will protect his interests against waste of material and time. Think it over! Also, I will be glad to give the reactions of any dye stain upon request of a reader of INDUSTRIAL FINISHING.

"Popular priced" jobs present difficulties not often discussed. Economy is the first consideration and the satisfactorily-finished surface is a requisite.

C-H Electric Space Heaters

The Cutler-Hammer Mfg. Co., (electric appliances) Milwaukee, Wis., in its Publication H-4 entitled, "Dictionary of Uses" describes and illustrates a number of possible uses for the C-H Improved Electric Space Heaters, including those for industrial heating and drying. This booklet of 24 pages, size, 4x9-in., is attractively printed on coated stock and contains many illustrations of modern space heater applications.

Holland Chemist Inspects Hercules Plants

M. J. Riemersma, technical service manager of the N. V. Hercules Powder Co., Rotterdam, Holland, was recently in Wilmington as a visitor nt the offices of the Hercules Powder Co. Mr. Riemersma, following visits at several Hercules plants, returned to Rotterdam in early December.

Mr. Riemersma directs the technical service, investigates new uses and markets for chemicals, and advises on European patents and processes for the Hercules Co. He is a native of Holland.

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Automobile Finishing Speeded Up

Second installment of a two-part article featuring the latest materials and methods employed in the cleaning, finishing and polishing of automobiles manufactured on a production basis

By K. N. Kathju

THE plan suggested herein is the result of the study of paint lines at about a dozen or more body and automobile plants. It is made as nearly ideal as possible. While the plan calls for various operations to be performed on different floors, when enough ground floor space is available, all the operations may be combined and the work can be carried out on the same floor. Referring to the accompanying chart, (page 48) I will take up each operation in its natural sequence, beginning with:

No. 1, Blow off: Assuming, however, that a body approaches the beginning of the conveyor line on the 5th floor, from the construction department, the first operation is the blowing off of the body, all over, with compressed air, with a view to dislodge all foreign matter from inaccessible crevices in the body.

No. 2, Acid cleaning: The body is thoroughly cleaned with a chemical cleaning compound.

No. 3, Cold water wash & hot water rinse: Washed off in cold water and later rinsed with hot water. (Not the reverse, for chemical reasons.)

No. 4, Force drying body after washing: The body is next passed through an oven for the sole purpose of drying it thoroughly on the surface.

No. 5, Tack rag: After it emerges from the oven, the body is thoroughly tack ragged and allowed to proceed to the primer oven.

No. 6, Priming body: One fair coat of primer is sprayed on the body, both inside and outside. The spraying inside helps to protect the body from rusting.

No. 7, Knife glaze: After the body emerges from the spray booth, it is allowed to air-dry approximately 5 minutes. At the end of that period, it is either spot glazed or glazed in solid with a glazing knife, depending upon the condition of the metal. The sole purpose of the glazing operation is to fill up the file marks and other defects in the metal, which may be hard to fill with the succeeding coats of surfacer.

No. 8: First double coat of surfacer.

No. 9: Second double coat of surfacer.

No. 10: Third double coat of surfacer.

Depending on the speed of the conveyor, three double coats of surfacer are applied either in a large continuous spray booth or in three different spray booths, allowing from two to four minutes between coats. The use of the type of material discussed in last month's article precludes all

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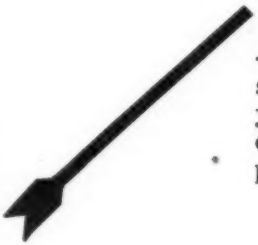

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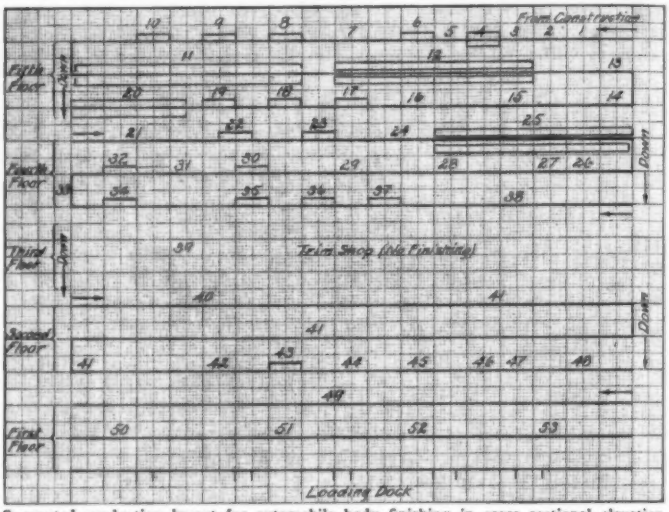
Suggested production layout for automobile body finishing in cross sectional elevation of five story building, using new type undercoats.

chances of the material sagging or running on the body. It is advisable that door jambs, the instrument panel, the inside of the windshield frame, and other similar parts be surfaced in the first spray booth, so that the opening of doors in the second and third spray booths is not made necessary.

No. 11, Curing (Baking): As the body emerges from the last spray booth, it is cured for one hour at 190° F. Thus we find that the prime coat, glaze, and three succeeding coats of surfacer have all been cured (baked) in the short period of one hour, and at a fairly low temperature of 190° F. The temperature of 190° F. is suggested because it is always possible to steam-heat an oven, giving a maximum of 190° to 200° F.

No. 12, Water sanding: The car body, as it emerges from the oven, is allowed to cool for a few minutes, and approaches a long water-sanding deck with troughs on either side of the overhead conveyor, where the body is first sanded with No. 240 sandpaper, and later "surfaced" for lacquer with No. 320 sandpaper.

*No. 13, Spot putty & gas*sand:* After the water-sanding operation, it is noticeable that while a very smooth surface has been obtained all the way around, certain inaccessible surfaces—especially in and around the mouldings, cowl curvatures, etc.—need further sanding. Consequently they are spot puttied with the same type of glaze as used after the prime coat; or with a pyroxylin putty which dries almost instantly, and is gas sanded immediately afterwards,

*Using gasoline as a lubricant when sanding.

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DEVOE & RAYNOLDS CO. INC.—America's oldest paint and varnish manufacturers—now offers a complete Industrial Service to manufacturers whose product is finished with lacquer, enamel, varnish or paint—a service rendered by men to whom you can confidently entrust your finishing problems. We shall be glad to give you further information—to tell you how your business can take advantage of this exceptional Industrial Service.

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using No. 400 sandpaper. This operation is very important in view of the fact that this is the last place where all the defects, due to imperfect metal, and other causes, can be repaired.

No. 14, Spot priming: (With pyroxylin primer.) As a result of the water-sanding operation, on the deck, it is also noticed that a lot of surfacer has been rubbed through to the bare metal. It is extremely inadvisable to lacquer such bare spots and as such the body is spot primed with a pyroxylin primer. This priming operation may be carried out further if the car body is to be finished in maroon lacquer, especially maroons which do not cover very solid. As such, the spot priming operation may be changed to a solid priming operation for maroons in the same booth.

No. 15, Scuff off and tack rag.

No. 16, Apply paper forms.

No. 17, First double coat of lacquer. (lowers.)

No. 18, Second double coat of lacquer. (lowers.)

No. 19, Third double coat of lacquer. (lowers.)

After the forms have been applied, the body enters three different spray booths which are equipped with a dozen or more agitator tanks containing lacquers of different colors, or which may be equipped with spray guns, to which material is carried by pipe lines from a central pumping station—generally referred to as a "mixing room."

No. 20, Force-dry: (½ hour at 125° to 160° F.) After the three double coats of lacquer have been applied, the car body is allowed to pass through an oven—force drying at 125° to 160° F. for about ½ hour. As it emerges from the oven, it is carried to the floor below by an automatic elevator, and there it is placed on the conveyor line again.

No. 21, Apply paper forms: On the conveyor line, paper forms are applied to the lower part of the body to offset chances of fogging the lower part with a lacquer of a different color, which is to be applied to the upper parts of the body, or which may be applied to the back uppers or the roof panel. After the paper forms have been applied:

No. 22, Spray upper back and roof panel: The upper and roof panel are sprayed generally in black, unless the car body is of one solid color. In that case the uppers and lowers are sprayed in the first set of three lacquer spray booths referred to above.

No. 23, Spray inside: As the body emerges from the spray booth, after the back upper and the roof panel have been sprayed, it enters another spray booth where the operator sprays the inside of the body—parts like instrument panel, door hinges, etc.

No. 24, Remove paper & gas off: The car is allowed to proceed on the conveyor and air-dry approximately 20 minutes, which allows enough time for one operator to remove the paper forms and clean off the surface with gasoline, where adhesive tape had been used to put the paper forms on the body.

No. 25, Water sanding of lacquer: At this stage, the car body is ready to be water-sanded all over very carefully with No. 320 sandpaper, or preferably, No. 400.

No. 26, Clean up.

No. 27, Inspect water-sanded surface.

No. 28, Spot-sand after inspection.

No. 29, Block-sand and spray touch-up.

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No. 30, Touch up all colors: After the cleaning up, inspection, spot sanding and block sanding in and around the mouldings, especially all spots which have been rubbed through—or high spots where there was too much surfacer left, or high spots which escaped detection before and had to be rubbed through—are touched up in the same color as the lower part of the body.

No. 31: This operation is immediately followed with the application of paper forms.

No. 32, Spot spray.

No. 33, Apply reveal forms.

No. 34, Spray reveals and the uppers: The reveals and the uppers are sprayed at this point when they are desired in a color different from the lower part of the body. If the entire body is to be of one single color, all spraying is done in the first three spray booths. In any case, this is followed by a long spray booth, where three different and distinct operations are performed.

No. 35, Mist coat, spray solid: The entire body is sprayed in one solid color, or in different colors, which is possible because of the forms applied around the mouldings which can be worked up or down to permit spraying either the upper or lower part of the body. This is necessary in view of the fact that the mist coat usually consists of 70 parts of a good thinner and 30 parts of color already on the job. A mist coat of this type is a necessity. But for this, after the cars have been polished, a great majority of the jobs would look off-color in spots.

No. 36, Spray skirt and wheel housings: After the mist coat has been applied, the skirt and wheel housings are sprayed in the color specified, generally in black.

No. 37, Spray inside and door jambs: The next operation is to spray the door jambs, either in the same color as the body, or in black, generally in black.

No. 38, Clean roof panels and brush prime roof mouldings: While the mist coat, skirt, and wheel housing, and the door jambs are air-drying, the roof panel is thoroughly cleaned, and the small mouldings around it are primed with a pyroxylin type of primer, in black. This operation is performed with a very fine hair brush, thus eliminating the chances of fogging the roof panels by a touch-up spray gun.

No. 39, Send to trim shop: At this stage the automatic elevator carries the body down to the third floor where the entire floor space is used in trimming operations. After the job has been trimmed and inspected, it is transferred from the third floor trim shop to the second floor.

No. 40, Gas off entire body, thoroughly: As it starts at the conveyor line, it is cleaned all over with a rag dipped in gasoline, followed by polishing.

No. 41, Polishing: It is needless to describe the polishing operation, because it has been discussed so often in the pages of this magazine. Generally two systems of polishing are used. One is hand polishing with a rubbing compound on a piece of cheesecloth which has been rolled into a ball. The other consists of using the polishing machine, for polishing purposes entirely. In either case it is necessary to slick up the job at the end of the final inspection with a polishing wheel, using generally a silk pad for the purpose. However, at the end of the polishing operation the car body

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is inspected, followed with the operations as listed below.

No. 42, Spot sand: (High or low spots, as detected by inspection.)

No. 43, Spray windshield header: (No booth necessary.)

No. 44, Spot spray: (No booth necessary.)

No. 45, Spot rub and polish.

No. 46, Black off mouldings.

No. 47, Touch-up reveals.

No. 48, Complete body touch-up.

No. 49, Touch-up after rub and polish: At the end of complete body touch-up, the job is carried from the second floor to the first floor by the automatic elevator, where special care is taken to touch-up the job very skillfully after the rub and polish operation on the floor above.

No. 50, Rigorous inspection.

No. 51, Spot spray, (polished job): The spot spraying is done over the polished surface, after carefully removing wax and other foreign matter left from the polishing operation.

No. 52, Complete body touch-up with brush: Small defects noticed at the end of the last inspection are taken care of at this stage.

No. 53, Slick-up: The slicking-up operation follows immediately, either using a liquid polish or preferably using a mechanical polishing wheel with a silk pad. The body is either carried directly to the assembly line or, if it is to be shipped out, it is carried to the loading dock for shipping.

This, in brief, is the latest practice of painting automobile bodies, eliminating a lot of hard work, floor space, time, etc., by using the latest type of products for undercoats, replacing both the oil and lacquer type primers and surfacers, as used in the past.

Detroit Office of Hilo Varnish

The new Detroit Office of Hilo Varnish Corp., is located in the General Motors Bldg., Room 3-133, telephone, Northway 4024. The office will be under the management of Mr. Frank J. Keeley, a Hilo finishing expert who is particularly qualified to serve the Automotive and Metal Finishing Industries.

Store Front Color Schemes

In accordance with the increasing attention now being given to the design and color of modern shop fronts, the Du Pont Home Decoration Service has developed color schemes for store fronts which will aid in giving a more attractive appearance without remodeling. Among these suggestions are the following:

Black trimmed in aluminum; jade green trimmed with cream; white, cream and jade green; straw yellow, white and dark green; Holland blue trimmed with white; fawn, cream and oak leaf brown; cream and patina green; dark brown, white and crimson.

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Drying and Hardening of Finish Coatings

What causes finishes to dry and harden, how drying is accelerated; what produces toughness, durability, etc.; practical notes from experience with paints, varnishes and lacquers

By Fred Mannhardt

THE DRYING of a film of finishing material applied to any surface is a matter of outstanding importance and concern to everyone identified with finishing. It means so much in so many ways, and at times the drying characteristics of a certain material can be a source of great annoyance.

Drying, in the ordinary sense, is taken to mean that a certain thing, to become dry, parts with (releases) its moisture or water content. But how about oil which has no water content?

Dip an object in water; then weigh it. It weighs more when wet than it does when dry. But dip an object in oil and let it dry; if anything, it weighs more after drying that it does when wet with oil. This is said to be due to the absorption of oxygen.

Place some pure linseed oil on a glass; it will take several days to become dry. Do the same thing to another piece of glass and expose it to sunlight, or some other source of heat. It will dry in several hours. The same is true of some of our colors. Some seem to never dry hard. Add a bit of drier, or good varnish, and you increase the drying speed.

These conditions prevailed for several hundred years—ever since oil painting was practiced. As time went on, new inventions and ideas were discovered and developed. When japan colors were added to the list, it was another great step forward. It seemed good to get something that could be recoated in an hour. Japan colors gave the color and opaqueness to the work. When varnished over, this gave it gloss and durability, and prevented fading or bleaching. All this was hurried along some more by forced drying in ovens.

After a while even this forced drying became too slow and required too much floor space for some lines of production. Last, but not least, along came lacquer. Its use in the last few years has greatly decreased the relative consumption of oil colors, I believe.

Some difference, when a job can be turned out with four or five coats in one hour! It may be well to bear in mind that lacquer also can be forced to dry faster. This can be accomplished by placing lacquer-finished articles in the oven. But if anything much is gained by this oven drying of lacquer coats, except on one-coat jobs, I fail to see it. The time taken to cool the surface, before another coat can be applied, will be longer in many cases than if it were allowed to air dry. This is especially the case if the article being finished is so heavy that it takes a long time to cool.

Several other things besides

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oven heat influence the drying of paint, varnish and enamel. Naturally, paint will dry much quicker in a warm and dry atmosphere than in a cold damp one.

Porosity of Wood

Here's another point: The undercoat or ground coat has a great deal to do with drying. If the surface you paint is absorbent, the ground coat sinks in, leaving a much thinner surface for the atmosphere to act upon, hence causing the paint to dry much faster.

This carries back to a previous article of mine in INDUSTRIAL FINISHING, referring to the porosity of various kinds of wood. Thinning a paint or lacquer will cause it to dry much faster. It may be well to state right now that a porous piece of wood requires, for its priming coat, a larger amount of oil than any of the remaining coats. This procedure protects the wood better, for as the oil dries slowly it has more time to saturate or "eat into" the wood.

Another reason for studying the porosity of wood! To make this more clear, get a can of primer and apply it to a spongy (porous) piece of wood; then apply the same material to a hard (close-grained) piece of wood. The primer on the soft piece of wood will dry first.

So far, we have learned that several different things cause drying; for example, evaporation, absorption of oxygen, the addition of driers, and the use of heat. The pigments used also have an effect of drying. Since varnish is so closely related to colors in the painting and finishing line—being largely a vehicle of mixing and a protector of surface—it is fitting that a little be said about it.

Varnish Characteristics

I will begin then by defining it. Varnish is a resin (one or more gums) dissolved in a suitable liquid which, when spread upon a surface, dries either by evaporation or chemical action, forming a hard lustrous coating capable of resisting—to more or less extent—the action of air and moisture. It must also possess transparency and durability. To possess these qualities, everything depends upon the resin, (or gums) and solvents. Some of the resins usually employed are mastic, copal, sandarac.

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These resins are obtained from trees. Some of the solvents are turpentine, alcohol and linseed oil. The oil-solvent varnish is the tougher but slower drying. Varnish also can be forced to dry more rapidly by heat. Space for this article will not permit me to go much further on varnish, its composition, etc., but one thing in particular should be called to every finisher's attention: Do not apply a rapid-drying varnish over half-dry paint, especially if the paint is long in oil, or you will crack or check the work. There's where the drying question comes in again, so you see that drying means a whole lot in the painting and finishing game.

The kinds of varnishes to use for various surfaces, and the heat they will stand in relation to the heat permissible for the colors the varnish covers—these matters are important but often overlooked. An example of the bleeding of colors when heated is as follows: red base, gold stripe, then varnished; heat it and see the red bake through the gold stripe and show through the varnish.

A good varnish fulfills its purpose, that is, it protects and keeps its color. If it does not do this, it is more of a nostrum than a varnish. In that case, reserve it for the cheap work.

Lacquer Not Faultless

With the inception of lacquer, a lot of trouble of the drying and dust-collecting kind has been eliminated. Nevertheless, some other kind of trouble is or may be with us, for example blooming, raising and bleeding. These things can be overcome if properly handled, but to go into detail here would make this article too long. If you are looking for fast-drying, durability and a hard finish, there is enough here from which to take your choice. There is a big field for discussion on this subject. Let's hear from some more INDUSTRIAL FINISHING readers.

Airplane Operation Cost

Figures worked out by an executive of a Western aircraft company, based on 100 flying hours a year, or the equivalent of 10,000 ground miles, showed complete operation costs for an average low-priced three-place open biplane, used in business, to be less than 10 cents per mile.

Sound-Proofing Bulletin

The Korfund Co. Inc. (mfr. of products to deaden vibration and noise) 225 E. 42 St., New York City, announces the publication of the first issue of "Isolation," a 12-page quarterly devoted to the study and application of sound-proofing of buildings and the isolation of machine vibration.

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"I have been Chief Engineer for the Noran Aircraft Co. since its beginning in 1927. I was asked to write you just what we do in our dope and lacquer room.

"I have made about 15 experiments in the last three months on different dopes and lacquers for an aircraft manufacturer and still feel that a lot of changes in dopes will be made in the next few years."—

FINISHING AIRPLANES

Chief Engineer of Noran Aircraft Co.* relates the results of his experience in preparing and using dopes for fabrics of airplane wings and fuselages, the use of aluminum and bronze powder finishes, lacquer finishes, etc.

By S. M. Finch

DURING THE LAST 12 years, I have experimented with aircraft dopes and lacquers, and have used practically every dope that is made. Most of the manufacturers of dope, according to the standard work sheets they furnish for finishing, recommend that the first coat be put on clear. Through my years of experimental work and building of airplanes, I find that the first coat should be 60 percent dope thinner and 40 percent dope. This coat should be put on with a brush and rubbed in so that it impregnates through the fabric.

To secure a high-class durable finish on airplanes, it is absolutely necessary that the fabric used on wings and fuselage be properly doped to secure adhesion to the fabric, and also to tighten the fabric. If the dope is not put on properly and the fabric properly treated with the first coat, the other coats will not impregnate into the fabric on the little spots that were not covered on the first coat. We use a 4 or 5-in. brush and lots of dope, thinned 60 percent on the first coat, making sure that the coat penetrates every spot and lays down all the fiber on the fabric. The way we mix our first coat is as follows:

Thinner, 60%; dope, 39%; retarder, 1%.

The retarder is used to prevent the first coat from drying too quickly because of the large quantity of thinner used.

In applying the second coat, we use 25 percent thinner and 75 percent dope. We never use cheap colored dope. Two brands of high-grade clear dopes are the only ones we use. We have found they give the best service after the ship has been subjected to the ultra-violet rays of the sun.

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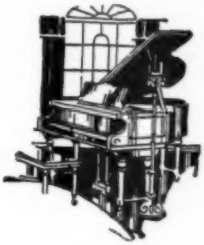
*San Francisco; "Bat" monoplanes.



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The third coat is 15 percent thinner and 85 percent dope. As the first two coats have been brushed to a maximum penetration into the fabric, the third coat does not have to be applied so thickly. After the third coat we always sand lightly—"water sanding" we call it.

Wet Sanding

We use sandpaper soaked in water; this gives the fabric a fine finish and eliminates the chance of wearing though the seams. If we are going to finish with aluminum or bronze powder, the fourth coat is impregnated with about 1/3-lb. of powder to the gallon. It should be brought to the attention of the finisher that all aluminum or bronze powders should be dry free from stearic acid and grease. The stearic acid will bleach the dope and make it spotty, and the grease will keep the aluminum or bronze powder from laying in spots about as big as a dime. It is necessary that the finish be opaque, or the ultra-violet rays of the sun will destroy the dope.

If we are going to finish with lacquer, we put on four coats of dope, water-rubbing the last two coats of dope, and apply the first coat of lacquer cut 100 percent with thinner and 4 percent retarder. The next coat of lacquer we cut 150 percent with thinner and, after it is entirely dry, we spray it with a coat of thinner containing 5 percent lacquer. This smooths the lacquer out and prevents it from bleaching out in spots.

Metal Cowling

The metal cowling aluminum is always washed clean with thinner before the primer coat is put on. The first primer coat is allowed to dry three hours before it is touched; then it is rubbed with steel wool and a last coat is sprayed on. At this point I would like to bring out that the ordinary primer will run and dry slowly; the very best grade of primer is none too good for a clean job. We always apply three coats to all metal. We use a clear varnish and water-sand the wood parts before applying the lacquers.

"Shake Before Using"

I will now mention something that should have been mentioned at the beginning of this article. *The dope should always be agitated before using.* Every fresh drum of 55 gallons, we roll and work over on the floor before we rack it. The cotton has a bad habit of settling in the bottom of the drums, and the mix is not uniform throughout the drum if it is not given a thorough mixing each time it is used—that is, if a drum is not used in two days.

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We allow every plane to dry 24 hours before it is moved to the flying field. We have noted that when a plane is moved onto the field after sitting just overnight that the ultra-violet rays of the sun have a tendency to make the fabric sag.

What Vibration Does

Our biggest trouble with lacquers has been that they will not stand the vibration; after being in service a short time they will crack or craze. The celluloid base of lacquers makes a hard-shell finish over the dope, but does not penetrate into the fabric, so that it is easily peeled when it once starts to craze. This has happened with every lacquer we have used with the exception of one. We have this brand of lacquer vibrated on a regular machine made especially for this kind of testing, and we find that it will stand considerably more vibration than any lacquers we have used, and we have used most of the old reliable makes.

Care of Paper Stencils

Do you take proper care of your stencils both while they are in use and when not in service? Stencils soon become unfit for use if they are not properly cared for. After each job, the stencil should be washed on both sides. Lay it on a flat surface and wash it carefully with turpentine. Care should be taken to avoid breaking any of the members while washing the stencil. When not in use, stencils should be placed between two sheets of composition board, with a piece of paper separating adjoining stencils.

Stencils used for oil colors should be given a thin coat of elastic varnish or shellac. If a stencil becomes damaged, lay it on a flat surface and shellac the damaged place on both sides. At the same time shellac a piece of tough wrapping paper and, when it becomes tacky, press the shellaced paper over the damaged part. When the shellac is dry, lay the stencil on a piece of glass and cut away the overhang of excess paper, following the lines carefully with a sharp stencil knife.

With proper care, a stencil will last for several years. If you have any stencils that are particularly valuable, it is best to always have an impression of these stencils filed away, so in case one is badly damaged a new one can be easily made to replace it.—J. K. Cooper.

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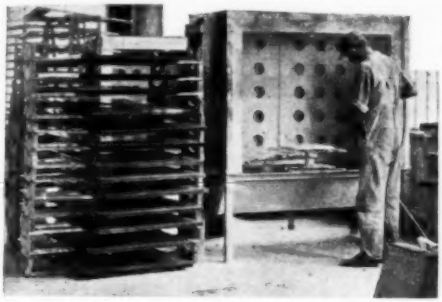

President of the Samuel Stamping and Enameling Co., Chattanooga, Tenn., describes and illustrates cleaning, spraying, dipping, drying, burning, and decorating operations included in the finishing process on steel and cast iron stove parts, in a plant that operates 24 hours a day.

By W. R. Samuel

Finishing Steel and Cast Iron Stove Parts

IN THE manufacture of both cook stoves and heating stoves, enameled steel and iron parts are used. While the finishing process on both kinds of material is similar in many respects, for the sake of clarity, I shall describe each process separately.

Referring to the floor plan layout shown in Fig. 1, steel parts are fabricated in the steel stamping department from which the

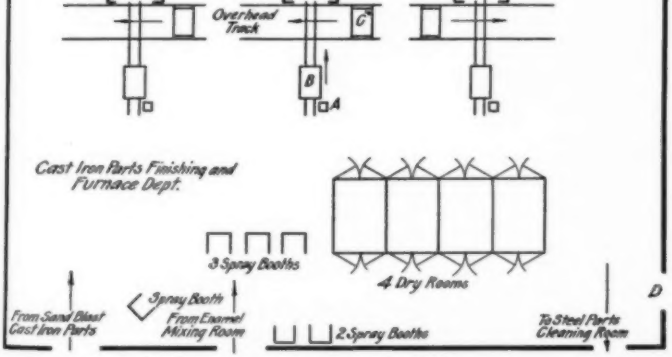

Fig. 1—Floor plan layout of the department in which cast iron parts are spray finished, force dried, and subjected to the high-temperature "burning-in" or "firing" in enameling furnaces. Notice the entering track and cross transfer in front of each furnace. In each unit the oven door is operated from control box A. The department devoted to steel stamping adjoins this department, with access through door D.

formed parts are taken to the steel parts cleaning room shown in Fig. 2. The parts are placed in large metal trays built of acid resisting metal and, through the use of an overhead traveling crane, the loaded tray is first immersed in the boiling chemical cleaner *A*, where it remains from 15 to 30 minutes; then the parts pass through a hot water wash *B*, and into the acid (sulphuric or muriatic) vat *C*, for 12 to 15 minutes; then through another hot water wash *D*, and finally into the alkaline wash *E*, which removes any remaining traces of acid.

The two vats (*G* and *F*) containing cleaning chemical and acid wash in the rear of the cleaning room are used to supplement the other equipment in the two divisions of the cleaning process requiring the most time. Following the cleaning and washing treatment, the steel parts are moved into the drying room where drying is accelerated by the use of the hot cleaning and washing solutions.

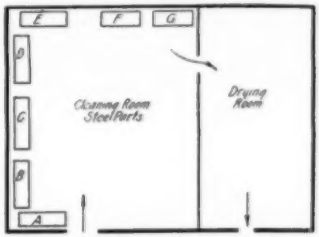

Fig. 2—Floor plan layout of the two rooms wherein steel parts are cleaned and dried. A and G, cleaning compound; B and D, hot water wash; C and F, acid wash; E, alkaline wash.

After remaining in the drying room about 10 minutes, the steel parts are taken to the finishing and burning department illustrated by the layout marked Fig. 3, where the first coat of enamel is applied at the dipping tanks. After draining the dipped finish, the parts are immediately hung by wire hooks on overhead conveyor No. 1, which has a speed range of from 5 to 29-f.p.m.

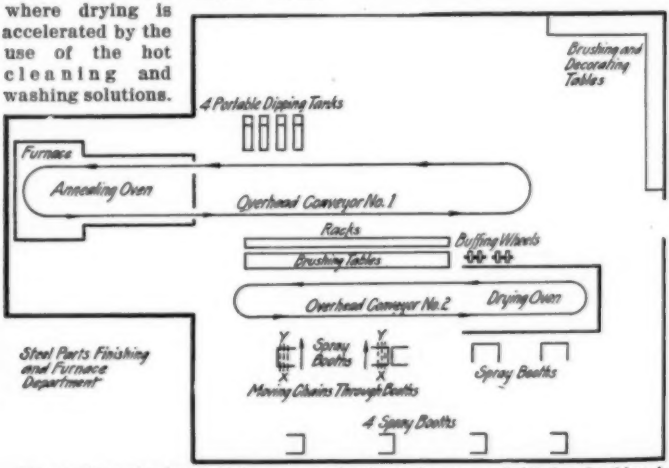

Fig. 3—Floor plan layout of department wherein steel parts are finished and subjected to high-temperature "burning-in" or "firing" in enameling furnaces. Chain conveyors carry parts through two of the spray booths in the direction indicated by arrows from intake end X to discharge end Y. (See Fig. 5.)

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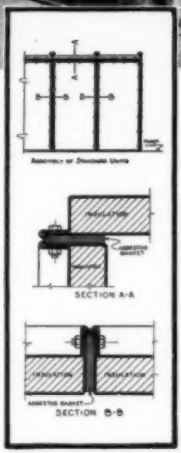

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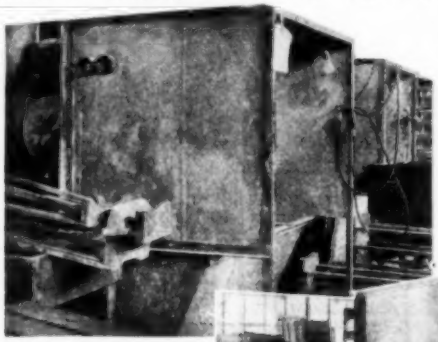
The conveyor and furnace operate together as a unit which is called a "continuous furnace." The efficiency of this type of furnace is increased by the exchange of heat from the hot parts leaving the furnace and passing cool parts entering the furnace, the cool parts thus being preheated.

For the ground coat a temperature of 1600-deg.F., is maintained in the furnace. Of course, the period of time the parts remain in the furnace depends upon the speed of the conveyor. As parts emerge from the furnace they are removed, placed on trucks and taken to the spray booths shown in Fig. 3. In this department, there are nine booths two of which are equipped with power chain conveyors as illustrated in Fig. 5.



Above: Fig. 4—A row of spray booths in the department where cast-iron parts are finished, as shown in the floor plan layout marked Fig. 1.

Right: Fig. 5—One of the two spray booths which are equipped with chain conveyors to carry steel parts through the booth while the spray operator sprays them. These booths are located in the steel-parts finishing department illustrated in plan by Fig. 3.

All steel parts are inspected at station *X*, Fig. 3, placed on conveyor chains, and as they pass through the booth the second color coat is sprayed on. The off-bearer receives the spray finished parts at station *Y*, and places them on conveyor No. 2, which carries them into the drying oven (see Figs. 6 & 7) and around to the brushing tables adjacent to conveyor No. 2. At this point parts are removed from the conveyor and the edges of the parts, such as oven doors, are brushed with various sizes of hand and rotary brushes (bristle brushes) which remove a narrow border of the second coat, leaving the ground coat exposed on these edges. This operation is done for decoration and protection.

After this brushing operation, the parts are placed in the open racks; they are carefully cleaned of all free color dust and then placed on conveyor line No. 1 for the second burning. A temperature of 1550 to 1560-deg. F., is used for the second burning. The temperature used and the speed

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G-E GLYPTAL lacquers, are now available in five colors: red, blue, green, brown, and aluminum—other colors to follow. Essentially all afford the same distinctive advantages. Besides preventing rust, they resist alkalies, weak acids, salt spray, mineral oils, gasoline, and kerosene; they have high dielectric strength; and they stand extremely high temperatures without discoloration.

G-E GLYPTAL lacquers are applied by spraying, dipping, or brushing; air-dry quickly; and form smooth, tough, yet flexible finishes. Let the G-E Merchandise Distributor nearest you explain more about G-E GLYPTAL lacquers. If you prefer, fill in and mail the coupon.

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of the conveyor are governed by the weight of the steel parts per piece and the color of enamel used. Light weight parts in the lighter colors receive lower temperatures and are carried through with faster conveyor speed than heavy parts finished in dark colors. On leaving the furnace after the second burning, those parts requiring a third coat are returned to the spray booths and the entire operation is repeated, using the same oven temperature and conveyor speed as was employed for the second coat.

Stenciling

Such parts as name plates, oven doors, etc., that require a trade-mark design, or name, are returned to the spray booth after the final color coat has been burned on; they receive a spray coat of enamel known as the stencil coat, the color being the same as the ground coat which is exposed around the edges of the parts—or a contrasting color determined by specifications of various customers. After being sprayed, the parts are placed on conveyor No. 2 (Fig. 3) and run through the drying oven; then to the decorating tables where stencils are placed over the parts and the stencil coat of enamel is removed by brushing over all the surface excepting what is protected by the stencil. Stencils used have solid letters or designs with open background to permit the removal of the stencil coat of enamel around the name or trade mark.

For the brushing operations different size bristle brushes and rotary brushing machines are used. After the stencil has been removed the surrounding surface is carefully and thoroughly cleaned to remove all free color dust. Stenciled parts are again placed on conveyor No. 1 and put through the enameling furnace, using the same furnace temperature and conveyor speed as was used on the second and third color coats.

I have found that this type of stencil, which permits the removal of the stencil coat from around the name or design, gives a cleaner cut job than the open-letter type of stencil used where the color is sprayed after the stencil has been applied to the surface. When decalcomanias are used, they are placed over the finish color coat (after burning), placed on the conveyor, and put through the enam-

Fig. 6—View of an overhead conveyor (No. 2, Fig. 3) from which are suspended racks that carry spray finished parts through the drying oven. Notice at right, the discharge end (Y, Fig. 3) of conveyor chains that pass through spray booth. A workman transfers parts from one conveyor to the other.

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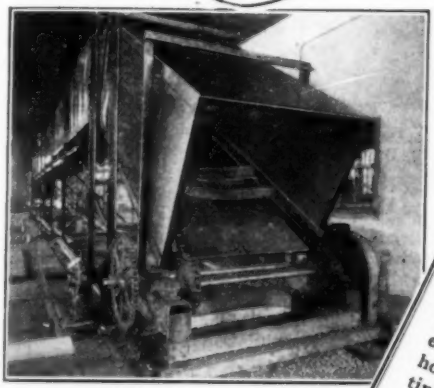

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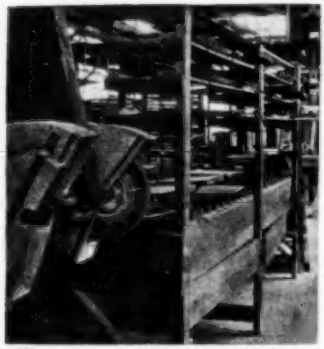


View near the "brushing tables" and open racks where steel parts are brushed, cleaned, racked and hung on conveyor No. 1. Fig. 3. A typical arbor for mounting rotary wire brushes or buffing wheels appears at extreme left.

eling furnace; they are subjected to treatment similar to the other coats or to stencil work.

One point I wish to emphasize is the extreme care which must always be taken to keep all equipment clean and to keep the finishing room free from dust. Between each change of color, all spray booths are thoroughly washed, the water and enamel being retained in the bottom of the booth, as illustrated in Figs. 4 and 5, until drained. Wire hooks used for hanging parts on conveyor No. 1 are cleaned after every trip through the continuous enameling furnace, to remove all traces of enamel. All of this is necessary to prevent the mixing of colors and to remove all accumulated particles of enamel or burrs, for it must be remembered that any foreign color or particles will be fused into the surface of the finished part if allowed to enter the furnace.

Cast Iron Parts

The finishing process on cast iron parts, while similar to that employed on steel parts, is accomplished with different equipment. Castings are delivered to the sandblast room where two types of sandblast are used. Large castings are placed in sandblast rooms and cleaned by sandblasting in the usual manner. Small castings are placed in a circular revolving blast where abrasive under air pressure is used to clean the surface. All castings are blown clean with air before leaving the sandblast room.

The first enamel coat is applied at one of the spray booths shown in Fig. 1. These booths are constructed similar to those in the steel-parts finishing room, and the same care must be used in keeping them clean. After the first coat has been sprayed, castings are placed in wood trays which

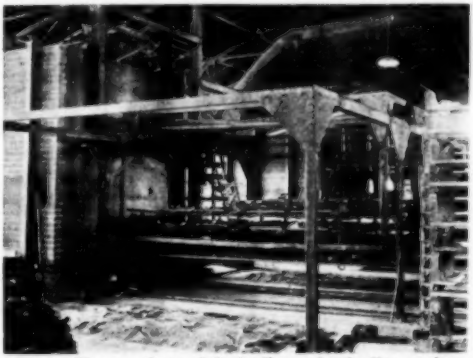
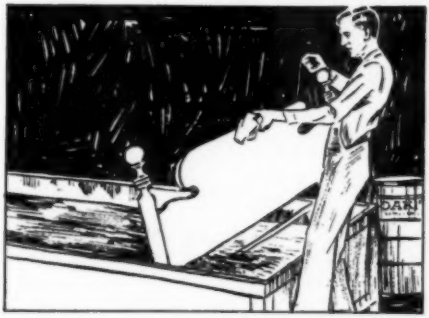


Fig.7—Close-up of one of the loading and unloading carriages which operate under overhead tracks (cross transfers) in front of each enameling furnace; see floor plan Fig. 1.



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are then stacked one above the other on trucks or lift-truck platforms and transferred to the drying rooms where they remain until thoroughly dry.

From the drying rooms castings advance to one of the box type furnaces, but before entering the furnace they are dusted lightly with a soft wool duster and carefully placed on the loading and unloading carriage, (*C*, Fig. 1, furnace No. 2). The castings remain in the furnace from 20 to 30 minutes at temperatures ranging from 1200 to 1300-deg. F., the length of time and the temperature depending upon the size and weight of individual castings and the color of the enamel used. Small light steel castings are subjected to lower temperature and shorter burning time.

Through the use of two loading and unloading carriages at each oven, the furnaces are kept in continuous use; one carriage is being unloaded and reloaded while the other carriage containing castings is inside the furnace. A view of one of the carriages is shown in Fig. 7.

Using furnace No. 2, Fig. 1, to illustrate operations, the furnace door is raised through manual control at the control box *A*, and an empty "loading-and-unloading" car is advanced into the furnace and stopped directly under the wheeless carriage loaded with castings. The car bed is raised sufficiently to engage the carriage and lift it off the steel supports inside the furnace. Then the car, with the loaded carriage resting on it, is withdrawn from the furnace. The loaded carriage just removed is transferred to the overhead I-beam tracks shown in Fig. 7, and moved to one side to permit the other loaded carriage to be transferred to the car and advanced into the furnace where it is lowered so that the carriage will rest on the steel supports. Then the released (empty) car is withdrawn from the furnace and the furnace door is closed.

After cooling, the castings are returned to the spray booths for the second coat of enamel which is followed by another burning, using the same time and temperatures as on the first coat. If specifications require a third coat of enamel, another spraying followed by burning, as before, is in order.

Reproduction of Wood Grain

Certain types of heating stoves —for instance some that resemble a popular style of talking machine in shape—require a reproduction of wood grain on both steel and iron parts. Such parts are first finished in a suitable solid color, as outlined above, and then taken to the graining room where the graining in appropriate color is applied by the soft-rubber-roll method, the figured design being transferred from plates to the surfaces of the stove parts.

Grained steel parts are again placed on conveyor No. 1, as indicated in Fig. 3, and the reproduction of wood grain is burned in, using the same temperature as in the firing of previous color coats. Iron parts go through identical finishing and burning operations as described before.

With the finishing process herein described and the equipment illustrated in the accompanying drawings and photographs, we are enabled, by operating on three 8-hour shifts, to produce finished stove parts at the rate of 150,000 pieces of steel per month and 500,000-lbs. of iron castings per month. With extreme cleanliness and frequent inspections, a satisfactory finish is obtained that is durable, uniform and smooth.

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Installation of Dip Tanks

Dip tanks containing metal-cleaning solutions should be elevated high enough above the floor to permit a free circulation of air underneath. This circulation of air will dry any moisture that collects, and the space under the tank gives room for inspection, the removal of any rust scale that may accumulate, and room for painting the exposed surfaces. Platforms or walkways should be removable and should not touch the tanks; at least 1-in. of space should intervene so that no accumulations of moisture will collect around the tank and cause rusting.

It is desirable that tanks containing paint or varnish remover have large drain pipes as free from elbows as possible, so they will drain off all sediment or slush; also large size overflow pipes, as these are easily cleaned of any collections of slush which may clog the overflow.

If a pipe in an elevated tank becomes stopped up, the plumber can easily get to it and remove the obstruction. A vat of hot lye that sets close to or actually on the floor, and which is surrounded by a platform, is a treacherous piece of equipment. Rust may eat through, unnoticed until too late, and if that tank is on an upper floor and a bad leak suddenly breaks out, mercy on the workmen and finished material on the floor under it!

But suppose the tank was elevated about 12-in. above the floor, and that the platforms surrounding it were removable; it could be inspected every week or two. Suppose a few places looked suspicious; a little scraping might reveal a pin hole caused by long rusting. The workman, charged with inspection, finds it before it has damaged anything, and he places a can or bucket under it. That evening orders are given to drain the tank, place a patch on it—welded in place or brazed with a torch. No damage has been done and no time is lost. The tank is good for many more months of service. The tank doesn't have to be removed, for it is high enough above the floor so that the welder can work satisfactorily without burning the floor. Set these tanks on legs or frames for future safety and convenience. The floors and tanks will last longer.—M. V. Leach.

Smoothing Cast Iron Before Finishing

To finish cast iron pieces that are too large to grind, and where a very smooth surface for a high-class finish is required, I suggest the following:

After the castings have been machined and are ready for the finishing room, brush up the rough surfaces with a coarse file to remove all the sharp pimples that might protrude through the finish.

Clean the surfaces by sandblasting or in some other manner—so the cleaning will be thorough—and then fill all large holes with suitable putty; then sand the puttied surface smooth.

If the casting is not sandblasted, spray a coat of high-grade clear lacquer over it; let it dry and spray two coats of primer all over and let dry for one hour or more.

Take a piece of cheesecloth and fold it into a pad to fit your hand. Dip this pad into a pan containing thinner to which a little clear lacquer has been added (the lacquer helps to keep the adhesion);

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squeeze out as much thinner as possible, then start to rub down the surface of the casting; rub one way only, and do not press too hard, or you will rub through the primer to the bare metal.

Dampen the pad occasionally with thinner to keep it wet. Do not wash out the pad, as the primer that sticks to the pad helps to fill in all the very small holes and slightly rough places in the casting.

After the casting has been rubbed smooth all over in this way, spray another coat of primer on it; let it dry and then rub it again. If the surface isn't smooth enough, spray and rub again; usually two or three rubbings are enough. When the proper degree of smoothness is obtained, any colored enamel or bronze powder can be applied.

Formerly, we sanded some large bases between coats and produced three bases a day to one operator; later, by changing to the above outlined method, we doubled our production—increased it to eight bases a day to one operator, and every one got by the inspector.—A. L. Medel.

Dip Finishing Metal Box Linings

Some years ago I had a large number of square metal box linings to paint by the dipping process. These metal linings were only open on one side—the front; no holes in sides, bottoms, tops or backs. Several methods of dipping were tried but all failed. The shells or linings were difficult to submerge, either upside down or right side up; placed in the material open side up, the shells would float; turned over and immersed open side down, an air cushion would be formed by the entrapped air, this preventing easy dipping and elevation after dipping.

The following methods of dipping the shells open side down were eventually developed and used with excellent results: Two holes were cut in the bottom of the dip tank and each hole was fitted with a perpendicular pipe. The top end of each pipe was fitted with a floating valve which was held up above the paint material by a suitable spring. When shells were placed in the paint, over these floating valves, the entrapped air in the shell would pass out through these floating valves. The shell would sink easily into the paint because no air was entrapped to hold it up.

When the inside of the shell was pressed on down, it pushed the floating valves under the liquid paint and a small quantity would flow through these valves, but it was caught in a bucket under the tank. When the shells were elevated, these pipes, equipped with floating valves, supplied the air necessary to prevent a vacuum forming and as a result the shells could be easily withdrawn. As dipped shells were removed, the floating valves came up above the surface ready for the next tank.—M. V. Leach.

Lubrication Under High Temperature Conditions

Recently a large concern in the Middle West complained about experiencing difficulties in moving oven trucks after the trucks had been in the ovens. Due to the intense heat of the ovens the wheels of the trucks would stick, and it was difficult to roll them out.

To eliminate this difficulty the management ordered 500 of the trucks equipped with special fittings which, it thought, would solve the problem. But the correct lubricant wasn't used. No change was made in the lubricant. The company found that the high temperature in the ovens still caused the oil to carbonize, and it was next to impossible to turn the wheels. No improvement was noted. The firm tried several other greases, but the results were all the same.

This problem was finally solved by removing the special fittings and using a high-grade enameling-conveyor oil which is now applied by means of an ordinary squirt can. There is no more carbonizing or sticking of wheels. The management is very well pleased with its "find."

I am writing this only to show that there is a difference in lubricants—that lubrication is a very important problem. Many times problems that are thought to be structural and complex, as in the instance above, are problems for the lubrication engineer and are simpler than they seem to be.—W. F. Schaphorst. M. E.

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Finishing Refrigerators

The work in our finishing department is to put into presentable shape the raw wood as it comes from the cabinet room and to dress up the refrigerator cabinet so that when the ultimate consumer looks at an Odorless refrigerator his first impression is one of favor. Finish has two functions; one to protect, the other to beautify; we strive to make our finish do both. My department is made up of experienced men. who are thoroughly sold on the idea of a better finish; they continually keep this ideal before them. We all realize that finish goes a long way towards making a sale.

When the box comes in from the cabinet room, our first job is to "fill the surface" with a paste filler. This filler contains the color needed, so that we get the wood properly filled and get our color at one operation. We thin our paste filler in the proportion of 7 or 8-lbs. of filler to a gallon of petroleum naphtha. Then we spray this filler on and allow it to stand perhaps ten minutes until partly dry. The filler is then rubbed into the pores of the wood with sea grass or moss, rubbing the filler across the grain and being sure that the filler is well rubbed into the pores. It is then cleaned off and allowed to dry to be ready for the next operation.

We allow this filler to dry three hours. Then the wood is given one coat of liquid filler or surfacer. This coat is made of a durable waterproof varnish with a pigment which helps fill up the pores of the wood, and gives a firm foundation for the finishing coat. This liquid filler coat is sanded smoothly after drying 24 hours.

The box is then ready for the

final coat of varnish. This coat of varnish is a high-grade waterproof varnish of known durability. Extensive tests are being made continually to get the best of materials for our purpose; no varnish or liquid filler is used that is not subjected to the most rigid tests to fill our requirements.

All our finishing materials are applied with the spray gun. . . . This method gives a more uniform finish, as the operator may control the finish better. The final coat is allowed to dry 36 hours, and the box is given a final inspection before it goes to the packing and shipping room for hardware and crating.

Every precaution is taken to see that our refrigerators are

(Continued on page 107)

Waukegan Chemical Co., to Enlarge Plant

A new factory building and a complete reorganization of the present buildings and equipment of the Waukegan Chemical Co., of North Chicago, at an estimated expenditure of $85,000, is announced by Casper Apeland, president of the firm. The new plant, which will be in operation by February 1, will be the result of an exhaustive study of lacquer plants all over the country during the past 18 months, and will be one of the most efficient production units in existence, according to Mr. Apeland.

The new factory building will be of steel and brick construction, fireproof throughout, and will cover a ground area 50x100-ft. It will be two stories high over 4/5 of the ground space, with the remaining 1/5 having four stories. In addition to the new building, the present structure will be entirely remodeled and used as an office and shipping room.

All units will be arranged on the "production flow" system, raw materials following a straight line through the plant to their emergence in the shipping room as finished products.

Eight 10,000-gallon tanks will be placed underground for the storage of raw materials used in the manufacture of lacquer, each being equipped with a separate pump and delivery system to the plant.

First See Watson's New Catalog

BEFORE ordering more supplies for your finishing shop, send for our new, illustrated catalog. You will be suprised at the new low prices quoted for strictly high grade materials. You can save time and money by ordering direct from Watson's.

Orders are carefully filled and promptly shipped

Clean Up and Paint at Inventory Time

Our Fireproof Cold Water Paint is unsurpassed for painting interiors of factories, mills, warehouses, etc., where a fireproof, healthy, durable and inexpensive coating is desired.

It is made in dry form ready for mixing with cold water. Five pounds make a gallon of good paint which can be brushed or sprayed and will cover 200 sq. ft. The tremendous saving over oil paint is readily recognized. It's different, it STICKS.

	400-lb. Barrels	100-lb. Drums	25 to 50 lb. Lots
Interior White, per cwt.	$4.00	$5.00	$0.06
Exterior White, per cwt.	6.00	7.00	0.08

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Crystal Enamel
The 1930 Finish
For 1930 many Manufacturers are adopting the M. & W. Crystal Finish on Metal Parts for the following reasons:
1—It is a One Coat Finish.
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QUESTIONS AND ANSWERS

This service department is conducted to meet the reader's need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

Rubbed and Non-rubbed Lacquer Sheen

We are using a satin-gloss clear lacquer and are hand rubbing table tops and chair seats with pumice stone. Our difficulty is that the rubbed surfaces appear *duller* when compared with the non-rubbed under-stock parts. Do you know of any material or method, quick in action and non-expensive, that will give us a uniform sheen?—A. F. Mfg. Co.

I believe there are two ways of overcoming this difficulty. Most flat lacquers are softer than clear lacquers and, when rubbed with pumice stone and oil, they often have a tendency to bloom or turn gray within 24 hours after being rubbed. This naturally makes the rubbed surface look duller than the non-rubbed parts. One large lacquer manufacturer* has developed a special type of flat lacquer which dries harder than the usual kinds of flat lacquer and can be rubbed in much the same way as a clear lacquer without blooming or turning gray after rubbing.

It may be that you need a different kind of flat lacquer. Also, it may be true that the luster of the unrubbed flat lacquer is too high to match a rubbed surface and this would cause the rubbed parts to appear duller than the non-rubbed parts—even if the rubbed surface does not bloom or turn gray after rubbing. If this is the true condition, then the correct solution of the problem is to buy the flat lacquer in a duller luster.

It is also possible that the pumice stone may be too coarse, or perhaps not enough rubbing oil is used with the pumice stone so that the rubbed surfaces are scratched to a considerable extent during rubbing. If this is the cause of the trouble, the use of a finer pumice stone and more rubbing oil should overcome the difficulty. Some finishers even mix a little rottenstone with the pumice stone in order to get a higher luster on the rubbed work.

From my past experience with trying to rub flat lacquers, however, I am inclined to believe that your principal difficulty is due to the type of flat lacquer itself.—R. L. Masterson.

*Name on request.

To Print and Finish Birch Dowels

I am making some birch wood novelties of ½-in. dowels, 7-in. long. I wish to print a row of black figures lengthwise upon these rods, the figures to be 5/16-in. high. I would like to print on the white wood and then color with water dye—a yellow or orange color—and tumble with wax for a finish.

Weighs 46 pounds

U. S. "Spray-All" Painter

has many advantages

Light in weight (weighs 46 lbs.) and portable, this light-duty, spray unit is built on the same principle as heavy-duty spray units. Its sturdy vibrationless air compressor is directly connected to a ¼ h. p. motor. (No belts or gears.) The "Spray-All" Painter maintains sufficient pressure to completely atomize painting materials to produce a smooth, beautiful finish. Not to be compared with toy outfits operating on the blower principle, but a real air compressor unit.

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5320 Harvard Ave.

Cleveland, Ohio

Any stencil paint "runs" with the grain of the wood. Flat type cuts into the center of the dowel before the top and bottom edges print.

I could finish the dowels in a dark shade and then print with gold, but would have the same trouble with the type cutting in. I have seen this class of work that was very smooth and neatly done.

Could you give me any information regarding this printing upon the round surface of the dowel?—A. J. B. (Toy and Novelty Mfr.)

I believe your trouble in printing figures on a ½-in. round dowel can be eliminated by rolling the dowel over stationary type instead of trying to make the impression while the dowel is stationary. This will eliminate the tendency for the flat-faced type to cut into the center of the dowel before the top and bottom edges are printed.

Manufacturers of advertising pencils naturally have this same problem to contend with. It is their practice usually to have a rubber stamp made showing the copy matter which is to be imprinted upon the pencil. The rubber stamp is in the form of a flat mat and is attached to the bed of the small printing presses which they use. A composition roller inks this rubber type and the pencils are fed out of a hopper or reservoir above the small printing press and are rolled over the stationary rubber stamp. This gives them a clean-cut impression without indenting the wood. You can probably work out a similar arrangement for printing on the round surfaces of your dowels.—L. F. Worlendar.

Refinishing Birch Mahogany to Walnut

Since a question under the above title has already been answered (Nov., page 100), I am only going to give another method for bleaching the stain on those birch mahogany pieces of furniture. I have used a ready-made cleaner and bleaching compound* on some very troublesome jobs, with success. After sanding the wood surface a few minutes, I use this cleaner boiling hot and apply with a brush. Then I give the surface a thorough sandpapering, or better still, use No. 0 steel wool and give the surface a vigorous wooling, after which rinse with clear water and let drip. If the first application is not satisfactory, give the surface a second treatment in the same manner. There is nothing in this process to retard the drying of the final coat.—J. K. Cooper.

*Name on request.

Correction of Paint Formula

In the November issue of INDUSTRIAL FINISHING, on page 44, there appear some formulas for process paint. Of these there are mentioned for black and blue, four items each. In each case they should read as two optional formulas containing part japan color and part oil color, which make two for black and two for blue, for example:

For Black

Ivory black in japan.....(parts) 1
Drop black in oil..... 1

or if you prefer

Ivory black in japan..... 1
Prussian blue in oil..... 1

For Blue

Prussian or cobalt blue in japan... 1
Prussian or cobalt blue in oil..... 1

or if you prefer

Prussian or cobalt blue in japan... 1
Flake white in oil..... 2

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When figuring what's gained or lost
On any lacquer grade,
It's not your first, but FINAL cost
That tells how much you've made.
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AND NOW —
ZELLAC
"Outdoor Exposure Grades"

Again Zeller achieves what heretofore has been considered impossible! The new Zellac "Outdoor Exposure" Grades provide a finish that is *absolutely impervious to all weather conditions.* Neither summer sun nor winter snows, — rain, wind, brine, sea-fog, nor ice, — can break past their amazing resistance. Even our own best lacquer products are now surpassed by the ability of Zellac "Outdoor Exposure" Grades to withstand weather exposure. Their success is without doubt one of the most significant lacquer accomplishments of the century.

Made for spray or dip application, for either a clear high-gloss or clear satin finish, the Zellac "Outdoor Exposure" Grades may be used directly over wood and metal surfaces or as a transparent top coat. And best of all,—*like our Zellac grades* for every industrial purpose, —they can be made to special formula for each customer's requirements. Write for full particulars of our "Outdoor Exposure" Grades,* giving thorough description of your finishing needs.

*We have also the pigmented grades formulated on the same lines, which withstand outdoor exposure conditions equally well.

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Bristol, Conn. Lenoir, N. C.
Milwaukee, Wis. New York City

A small typographical mistake to be sure, and anyone accustomed in handling paints will know that at once; but for accuracy's sake I am calling your attention.—F. S. Araki.

Another Acid-Proof Finish

The following method for finishing laboratory furniture in an acid-proof finish has been used for many years and is quite satisfactory. Formulas are as follows:

Solution No. 1

Copper sulphate.....(grams)	125
Potassium chlorate.....	125
Water 1,000	

Solution No. 2

Fresh aniline oil.....(grams)	150
Conc. hydrochloric acid.....	180
Water 1,000	

After the wood has been sanded free from any trace of paint, grease or chemicals, brush on two coats of solution No. 1 boiling hot, allowing each coat to dry thoroughly before the next coat is applied. Then apply two coats of solution No. 2 in the same manner. When the wood surface is completely dry, wash off the excess chemicals with hot soapsuds. Finish with raw linseed oil. A polish is obtained by rubbing the oil down with a cloth or sponge.

Whenever the finish gets dingy, go over it again with a coat of linseed oil and rub smooth as before.—D. M. Martin.

Turnings; Carvings

To finish wood turnings and carvings, the same treatment is used as in finishing end grain; sandpaper smoothly first and, if staining is included, use the stain weak. On other finishes apply a thin coat of white shellac. When dry, sandpaper and then proceed with the regular finishing schedule.—Jos. Cowan.

Will not

Bleed or Fade
Raise the Grain
Blister Veneers
Loosen Glue Joints
Rub Off Under Filler

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It's....

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REG. U. S. PATENT OFFICE

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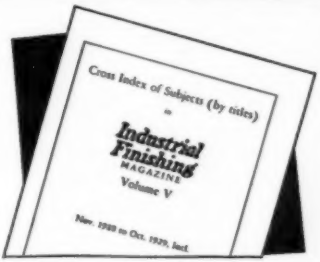

THIS 16-page booklet is a handy "Reference Index of Subjects" which appeared in 12 issues (Nov. 1928 to Oct. 1929, inclusive, Volume V) of INDUSTRIAL FINISHING magazine. All cross indexed and arranged alphabetically. Approximately 950 listings in the 16 pages. Forms ready reference key to an immense variety and volume of latest information about modern finishing of products in the factory. If you have saved your back copies of INDUSTRIAL FINISHING, you should have this reference index. Bound copies of the complete volume V, with reference index included, can also be obtained at the price of $5.00 each, postage prepaid.

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Industrial Finishing

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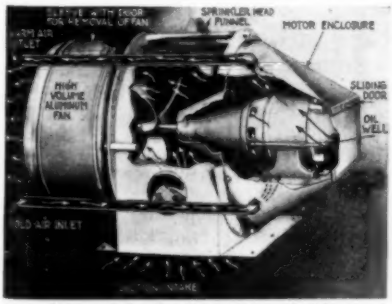
Presenting briefly, certain outstanding features of new materials and improved equipment which have been developed for use in modern industrial finishing departments

Improved "Explosion Proof" Ventilating Unit

The Paasche Airbrush Co., 1921 Diversey Parkway, Chicago, Ill., announces a new type "Explosion Proof" ventilating unit, with air-cooling intake, which is said to be a very modern and safe method of obtaining the air circulation necessary for the health of spray operators and safety of property from destruction by fire.

This unit may be mounted on the roof of a building or on the outside wall of a building with the motor on the outside, or it can be mounted on the top or sides of the booth.

This new type "Explosion Proof" ventilating unit is claimed to entirely eliminate such a great fire and explosion hazard as open motors with belt drives. It is a great advancement in design for use in all finishing operations, especially where lacquer and inflammable coating materials are used.



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The outstanding and exclusive features are:

1—Special designed high-volume aluminum fan, curved and shaped to provide a high volume of air without friction or loss of power; perfectly balanced.

2—Fans easily detached or attached on self-centering tapered shaft with puller and tightener nut, making removal quick and easy.

3—Clean-out sleeve with door for quick removal of fan.

4—Special designed motor with sealed sleeve bearings. Oiling feature at one location reached through opening of door for that purpose.

5—Motor housing designed so that inlet opening may be placed in horizontal or vertical position with inlet to right or left, top or bottom.

6—Outlet may be placed in any direction; for roof outlet use 90-deg. long-sweep elbow and roof cap of proper design.

7—Motor housing completely seals the motor away from the path of the fumes, preventing explosive gas or lacquer mist getting into the motor frame or mounting. Flexible pipe supplies air

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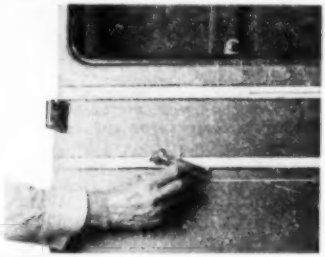

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circulation for cooling from the outside, thus making the motor as safe when mounted inside of a building as it would be if located on the outside—a convenient feature for oiling and wiring of motor.

Du Pont's New Yellow Dye

The Dyestuffs Department of E. I. du Pont de Nemours & Co. is placing on the market its new color, Du Pont Scarlet Y for Lakes, which is yellower in shade than the previous brand, Du Pont Scarlet 2R for Lakes, but similar in properties and strength.

This dyestuff is extensively used by the lake trade as a barium lake, for coated paper, printing ink and wall paper and also finds some use in the manufacture of linoleum goods.

Du Pont Scarlet Y for Lakes is soluble in water and is converted into lakes by dissolving to a clear solution and precipitating with barium chloride or basic lead acetate. The lakes possess good brilliancy and reduce to bright shades with zinc oxide.

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The "Sauter" single-throw self-winding time switch illustrated here, is used to turn "on" and "off" blowers, pumps, ventilators and other electrically driven machines or equipment that can be operated on a predetermined time basis; also, this automatic time switch is useful for timing processes, pre-heating glue pots, type-metal, kilns, etc. The main switch is motor operated, air-break, rotary and self-winding. The motor is of the universal series-wound type, with jumper

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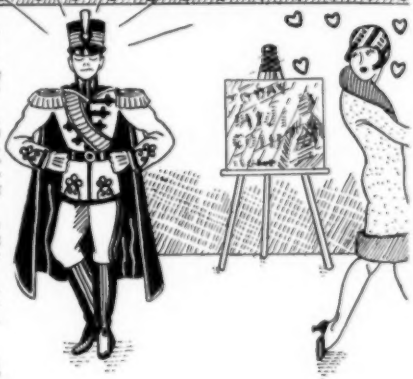

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arrangement on the field coils to permit operation on 115 and 230-volt direct current or alternating current of any frequency. The clock has a four-day mainspring, but is rewound automatically twice every 24 hours.

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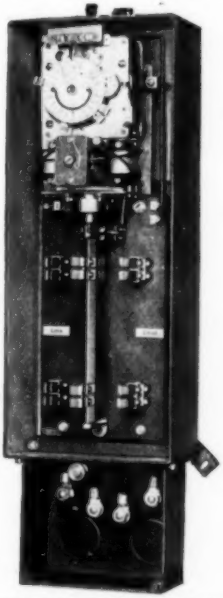

Starts and stops machines automatically at predetermined time.

functions every seventh day. A single 24-hour dial serves both for time setting and for program setting. Where it is desired to have the operations conform to a constant schedule, the plain dial is used.

For lighting circuits on an all-night or part-night schedule, the astronomic dial is recommended,

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Is your finish satisfactory in appearance? What does it cost per square foot?

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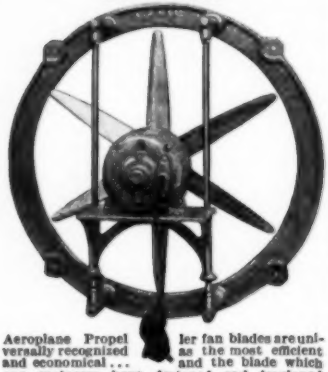

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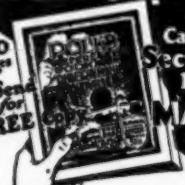

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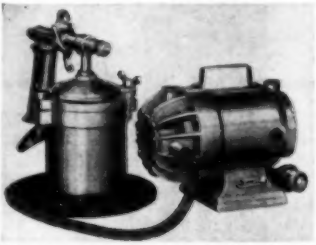
Tornado Portable Electric Paint Sprayer

The Breuer Electric Mfg. Co., 852 Blackhawk St., Chicago, has recently placed on the market a new electric paint spray machine (Compressor Type) of a new design for touch-up work, shading and light finishing and refinishing

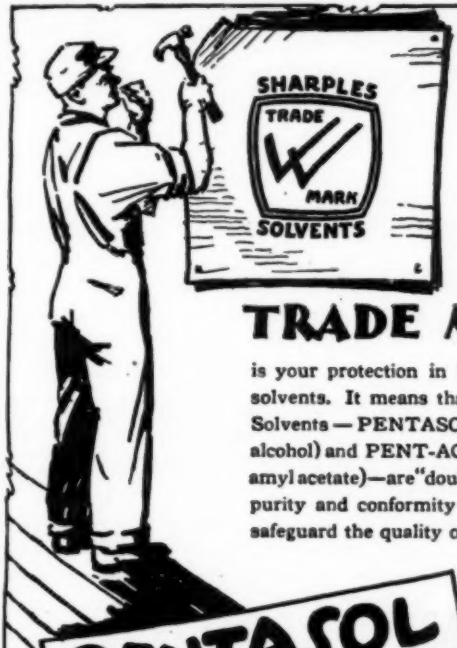


Has rotary type of compressor directly connected to 1/3-h.p. universal motor.

jobs, as well as for semi-production and maintenance industrial painting work.

The new Tornado Portable Electric Paint Sprayer is of the Rotary Compressor Type, built of aluminum castings, equipped with 1/3-h.p. G. E. universal motor, and develops a pressure of over 35-lbs. Compressor unit weighs 7-lbs.

The Tornado Spray Gun, of unique design, is equipped with two tips, one slotted for fan spray and the other, narrow spray, and covering an area of 2 to 14-in. A handy adjusting screw controls the amount of paint to be used.



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GRAINED METAL

The graining of metal to simulate wood finishes is growing rapidly. Perhaps you too are doing this type of finishing and are dissatisfied with the results obtained with your top coat lacquer.

We have conclusive proof from large manufacturers of automobile moldings, partitions, metal office furniture, trunk racks, etc. that our 303 Gloss and 313 Flat Graining Lacquers are remarkably well suited for this work.

For durability, workability, body and smooth flow over graining inks, we recommend them confidently.

THE Joseph F. Glidden FOUNDER AND PRESIDENT VARNISH PRODUCTS Co
12900 Berea Road
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The complete outfit is equipped with a quart container, two tips, 20-ft. of reinforced rubber covered cord, and 8-ft. of rubber web covered hose. The gun weighs 2-lbs.

Improved Fountain Striper

The E. M. Reeves Co., Flint, Mich., announces improved fountain stripers for running color stripes on finished surfaces—automobiles, furniture, toys, sporting goods, etc.

As illustrated in the accompanying cut, this fountain striper is mounted in a manner similar to the pencil or pen of an ordinary

"Carry striper in hand as fountain pen."

compass. The other leg of the device has a ball point which serves as a guide to space the stripe at a certain convenient distance from a formed edge, or temporary guiding edge either straight, curved or irregular in shape.

The span of distance from striper point to the ball guide point is adjustable and striper points for making narrow or wide stripes are interchangeable. Complete directions for doing all kinds of paint or lacquer striping, with this "Jiffy" striper, are furnished by the manufacturer.

Popular-priced finishes are often developed by the use of a combination lacquer and paint system in instances where price, finishing-room conditions and requirements of the finish contribute to difficulties in the regular schedule.

The Blue Knight's Column

FOR awhile it seemed really true; that EVERYBODY could be rich.

Then the paper-house market collapsed, and an old lesson was taught once more: Don't buy quotations—BUY VALUES!

FOR all firms who sold VALUE and bought VALUE, 1929 has been a marvelous business year. We can't let it slip by without expressing our heartfelt appreciation to our customers in many industries to whom we have been of mutual VALUE.

The crash is over—let's forget about it, but not the lesson: Don't buy quotations—BUY VALUES—even in lacquer. In 1930 buy values that endure.

Merry Xmas To You All

ROXALIN FLEXIBLE LACQUER COMPANY, Inc.
105-9 SEVENTH AVENUE
Long Island City, N. Y.

WRITE to our Service Department for any of the Research Bulletins listed below, prescribing a series of solutions to important lacquer problems . . . or for an interview with one of our executives on your problem.

- ☐ No. 21—About Flexible Lacquers for Brass, Aluminum and Nickel Silver.
- ☐ No. 23—About the *one coat* color backgrounding of etched name plates.
- ☐ No. 24—About Wood cement for Lacquer finished furniture.
- ☐ No. 26—About a Non-Jellying Bronzing Lacquer.
- ☐ No. 27—About a Tarnish proof Lacquer for Silver and Brass.
- ☐ No. AB—About a Flexible Finish for Cork and Tile Flooring.

Regardless of all the cheap substitutes for *Pure Shellac* on the market, the demand for

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—that high grade PURE Shellac — is increasing.
Quality will tell.

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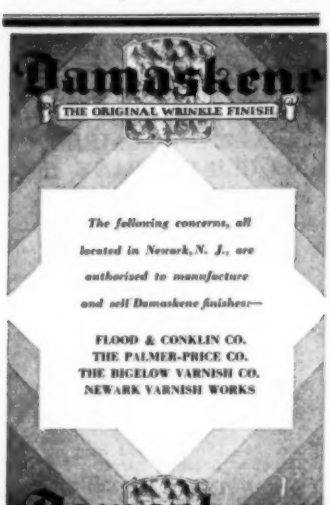
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THE ORIGINAL WRINKLE FINISH
The following concerns, all located in Newark, N. J., are authorized to manufacture and sell Damaskene finishes—
FLOOD & CONKLIN CO.
THE PALMER-PRICE CO.
THE BIGELOW VARNISH CO.
NEWARK VARNISH WORKS
Damaskene
THE ORIGINAL WRINKLE FINISH

Fillerub Improved

Oscar Smith & Sons Co., (finishing, packing and upholstering supplies) Philadelphia, Pa., makes the following announcement—important to them, significent to others:

"For 25 years, we have been selling *Fillerub* (a prepared vegetable fiber) in original compressed bales of importation. While the demand has consistently increased each year, the increase was not, in our opinion, commensurate with the merit of the article or the growth of wood finishing in this country.

"During October we made an intensive survey, canvassing both users and non-users of *Fillerub* and invited candid criticism. It was made perfectly clear to us that our *Fillerub* was packed too tightly and contained too great a percentage of short pulverized fiber to appeal to all possible users.

"We immediately installed equipment to correct both conditions and are now ready to ship at once from stock *Fillerub* thoroughly opened and loosened—with fibers separated and with the shorts and pulverized fibers eliminated. The texture is now almost like long curled hair and is as easily handled. A handful for rubbing is as easily taken from a bale, as now prepared, as a handful of hair from a bag.

"The present packing is in burlapped bales of about 300 to 350 lbs., loose pressed. The labor involved and the shrinkage in weight occasioned by the cleaning process necessitated a slight advance in the price, but actual tests prove that the cleaned, opened *Fillerub* is still more economical at the present than the former quality and packing at the former low price.

"In its present improved condi-

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tion, many are using it not only as a filler rubber, but also for general upholstering.

"The new fiber, as now prepared, we call *Improved Fillerub*, and testing samples are ready for distribution. We can still furnish the original quality and packing of *Fillerub* to those who want it, but we are fully convinced of the economy and efficiency of the *Improved Fillerub*."

Finishing Refrigerators

(Continued from page 87)

finished the best way possible, and we are continually in touch with the most progressive manufacturers of finishing products to improve, wherever possible, the appearance and durability of the finish.

We are working on a fast production schedule and, with our large output, have lowered our finishing costs, permitting more quality in the materials used, which of course reflects in satisfied customers and more orders for us all.—Napoleon F. Fine.

Lacquer Sealers in Wood Finishing

Lacquer sealers for wood finishing have come to stay. Why not? They are comparatively low in cost and they are satisfactory.

The sealer is applied by spraying, and can be sanded in from 30 to 40 minutes. I have not yet seen one that will sand entirely satisfactorily in 30 minutes, since those I have had occasion to examine all showed a slight tendency to clog the sandpaper, if sanded within a half hour. However, the better ones will sand satisfactorily in 40 minutes—and a material that

Is Pure Shellac Always Pure?

The percentage of Shellac Gum used is undoubtedly pure, but what about materials such as Rosin and other Alcohol soluble gums? Why not insist on protection against this form of adulteration? The following warranty is your protection.

"We guarantee the material in this package to be strictly pure Shellac Varnish, composed of Shellac Gum cut four pounds to the gallon in No. 1 Special Denatured Alcohol 190 Proof, and to be free from Rosin, added Wax, excess moisture, dirt, or other adulteration.

Clean as a Hound's Tooth"

If it were possible to make this guarantee stronger we would gladly do it.

Try Strictly Pure Shellac Just Once—You'll Always Use It.

Look for our guarantee label on the package. Prices on request.

Barrett Varnish Company

1532 South 50th Court Cicero, Ill.

Style No. 77

Style No. 77 is a light weight chemical cartridge respirator designed for protection on all operations where injurious or obnoxious vapors or gases are encountered. Especially developed for paint spraying. Made of aluminum with a soft molded sanitary cushion to fit snugly against the face. There is real comfort and protection in the No. 77. Price $4.50 each.

CHICAGO EYE SHIELD CO.
2300 Warren Ave. Chicago, Ill.

DIFFICULT LACQUER PROBLEMS
are being solved satisfactorily with
MAXWEAR
(MAXIMUM WEAR)
INDUSTRIAL LACQUER
HOOSIER PAINT WORKS
FORT WAYNE, IND.

will do that is a big help in speeding up production.

A low-cost but nice-looking finish can be produced with one coat of lacquer sealer and one coat of flat varnish over the regular stain and filler. One must be very careful that the filler is entirely dry before applying the sealer. If the filler is not dry, the sealer will have a tendency to make it swell and there will be ridges in the finish where the sealer lifted the filler.

I have had personal experience with a case like that just mentioned. We were using a combination stain and filler and, after letting that dry overnight, giving it one coat of lacquer sealer, sanding in an hour and then applying a coat of flat varnish. After the sealer was put on and sanded, the surface appeared perfectly smooth; but after the flat varnish was applied, ridges appeared at all places where the wood was slightly open in grain and porous.

Our first thought was that the sealer was getting through the veneer, soaking the glue loose and causing the veneer to lift. Before actually condemning the sealer on this account, we tried another filler. We put both the new and old filler on the same piece of wood, and then treated it the same as in our regular process. We found that the new filler worked fine, giving a perfect finish, while the old one still showed the ridges.

The moral of this is, that, if you do not get a good finish with the sealer, try a new filler. Some fillers have much more oil in them than others, and as a result they don't dry so hard, and there is more tendency for a lacquer sealer to lift them.

Some finishers use two or three coats of rubbing lacquer and then give the finish an oil rub. It will

ADVERTISING PAGES REMOVED

be to their advantage to investigate the sealer, I find that it is advantageous to substitute a coat of sealer for one coat of rubbing lacquer. The sealer builds better than most rubbing lacquers, and so will give a fuller appearance to the finish. In addition it is much cheaper and will, in many cases, cut wood-finishing costs to a noticeable degree.

The sealer is also often used under pigmented lacquers because it can be sanded, and so give a smooth finish to the top coats.—Clarence Steinhoff.

How to Use the Spray Gun

A question frequently raised by sprayers and finishers refers to the correct distance between spray gun nozzle and the surface being sprayed, when lacquer is used. It is obvious that, should the distance between these two points be too great there is some danger of the spray drying before it reaches the surface of the work, or immediately thereafter—before it can flow out into a film. This would mean wasted lacquer, spoilage of the film surface, and filling the air with a fog of minute particles of cotton and gum—a deadly fire hazard.

It has been our experience that an average distance of 10 to 12-in. can be recommended when working with, say, 50 to 60-lbs. air pressure, using lacquer at ordinary spraying viscosity.

Here are some practical hints found to be very satisfactory and vouched for by a leading manufacturer in the lacquer field: In spraying across large surfaces, the gun should be held at the same angle (at right angles) all the way across the surface, and always at the same distance from it.

SAFETY

in the Finishing Shop . . . . . .

against fumes, dust, fire and other hazards is assured when you adopt PULMOSAN safety devices.

Write us for full information on any of the following items.

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Respirators
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174 Johnson St. Brooklyn, N. Y.

Kindly send details of your Safety Equipment recommended for Finishing Shops.

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STABILISAL "A"

Stabilizing Bronze Lacquers

STABILISAL "A" is a material that has been used for several years in Europe as an addition to nitrocellulose bronze lacquers, to prevent their jellying and to minimize the tarnishing of the metallic bronze powder in the dried lacquer film. Polished metal surfaces, protected by a clear metal lacquer containing very small amounts of Stabilisal "A", will not tarnish.

The principal advantages in its use are the elimination of waste of lacquer due to jellying and thickening before using as well as an increased durability of the resulting finish.

Samples and literature upon request.

KUTTROFF, PICKHARDT & CO., Inc.

1150 Broadway New York

What better gift than good health?

BUY Christmas Seals

The National,
State and Local Tuberculosis
Associations of the United States

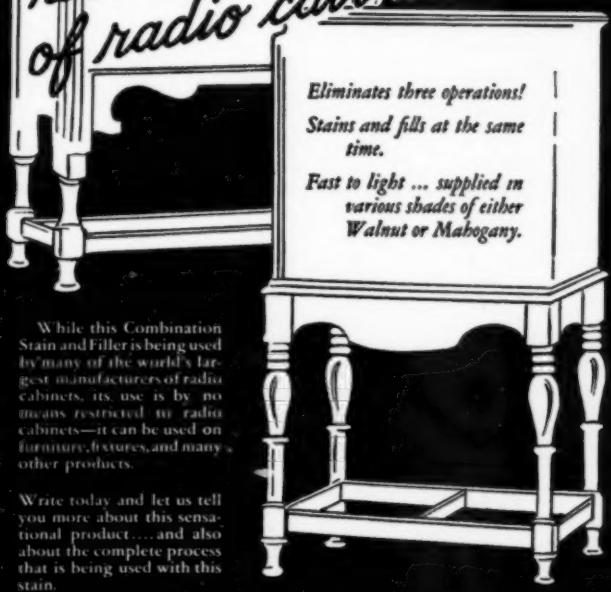
Avoid any pivoting of the wrist in a circular motion. Avoid blowing over the semi-wet film surface if possible; for instance, when spraying a surface that is held in level or horizontal position, one should start spraying at the nearest edge and work across the area, moving towards the rear of the booth. Spray along all bevels, edges, crevices, etc., before starting on the broad surfaces; this will avoid those "misses" which are the signs of haste and carelessness.

Each stroke should pass clear across the work; the gun should be carried beyond the edge, or the trigger should be released just at the moment of rest at the edge, before returning. This will avoid piling up the coating of material at the ends of each stroke, which causes heavy edges. Since the average spray stream only gives a full-body coating across about three-fourths the width of the spray, each stroke must overlap the preceding one, but it should always be blown away from the material deposited by the preceding stroke.

It has been my experience that a large portion of poor spray work is due to dirty spray guns and equipment. A clean spray gun is absolutely essential for good work. In addition to cleaning the gun itself, the air line, hose, connections, separators, etc., all need periodical attention; dirt, oil and water are lacquer's worst enemies. —D. M. Martin.

In far-off China, American-made outboard motors are gaining favor rapidly; the shallow streams bar the use of larger vessels, and the outboard motor boats expedite travel in sections lacking rail or highway facilities.

Our new Combination Uniforming Stain has revolutionized finishing of radio cabinets —



Eliminates three operations!

Stains and fills at the same time.

Fast to light ... supplied in various shades of either Walnut or Mahogany.

While this Combination Stain and Filler is being used by many of the world's largest manufacturers of radio cabinets, its use is by no means restricted to radio cabinets—it can be used on furniture, fixtures, and many other products.

Write today and let us tell you more about this sensational product.... and also about the complete process that is being used with this stain.

INDIANAPOLIS PAINT & COLOR CO.

INDIANAPOLIS, INDIANA.

Industrial Finishing

Issued fifteenth of each month. Distributed exclusively to executives and foremen finishers in all kinds of industrial plants where finish coats are applied.

PRACTICAL PUBLICATIONS, Inc.
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Advertising rates on application.

EDITORIAL

Recommendation on Colors for School Furniture

A summary report of a general conference of manufacturers, distributers and users of school furniture recently held in Chicago, Ill., under the auspices of the Division of Simplified Practice of the Bureau of Standards, Department of Commerce, has just been made public by the Division. A simplified practice recommendation on colors for school furniture was unanimously approved at this conference.

This recommendation applies to school (pupils' desks), teachers' desks, movable desks, recitation seats, chairs, tablet arm chairs, tables, typewriter tables, library furniture, filing cabinets, bookcases, kindergarten tables and chairs and laboratory furniture.

The colors for stock varieties of school furniture will be known as *School Furniture Brown*. The industry has fixed light and dark limits of shades within the color. While any shade within these limits will be considered as conforming with the requirements for School Furniture Brown, it is understood that every effort will be made to conform as nearly as possible to the selected median shade. Reproduction of the median shades on plain or quartered oak and on maple are included in the report of the conference.

Master color blocks, selected by the industry as representing the permissible range of shades of this color, will be used in the preparation of duplicate color blocks for matching in manufacturing and for sales purposes. For production and sales purposes, the National School Supply Association, in cooperation with manufacturers' committee, will prepare and distribute duplicates of the master blocks of the different woods used in manufacturing furniture covered by this program. The Association, with the aid of a committee of the industry will establish the procedure necessary to insure the reproduction at any time of master and duplicate blocks.

Duplicate color blocks supplied by the industry in accordance with the above will be labeled as follows: "The color of this block conforms to Simplified Practice Recommendation R111-30, U. S. Department of Commerce."

These recommendations are to be effective from January 1, 1930, subject to annual revision by the Standing Committee.

The simplified schedule, as set forth above, has just been submitted to the members of the industry for their written accept-

ance. When sufficient signed acceptances, representing at least 80 percent of the industry, by volume of annual production, are received, the recommendation will be printed as part of the "Elimination of Waste" series of the Department of Commerce, in accordance with the regular procedure of the Division in its cooperative work with industry.

Art Moderne's Value to Industry

Extreme Art Moderne furniture of fanciful, bizarre, and strange design has performed, for those engaged in the manufacturing and marketing of fine furniture, a service more far-reaching than the actual profits realized on the sales. Whether the individual approves or disapproves of this mode of interior decoration is of little consequence. The effect of the new and attention-attracting Moderne designs has increased public interests in the decorative possibilities of all furniture and accessories.

The bright, clean cut designs of this new mode have presented fine furniture's message to the buying public in a way that would have been an almost impossible task for the most effective, concentrated advertising plan that could be developed to popularize established designs.

Antique furniture designs, often dull and unimpressive in appearance, have not appreciably increased furniture sales. The average home already contains "old" furniture, and there is little sparkle or desirability attached to a house full of "imitations."

It is more than probable that in the buyer's estimation, high-grade furniture has been cheapened by the too frequent "clearance sales" of very ordinary furniture. Regard of price consideration toward furniture can be placed farther in the background when furniture makes itself desirable enough to be universally considered not only for its utility value but as something of a luxury. Establishments producing luxuries report remarkable sales each year and enjoy frequent and tremendous increases in their volume of sales.

Art Moderne furniture is not cheap furniture. It does not apologize for being furniture, but rather seems to exhibit pride in its purpose and mission. More designs of this forceful nature will encourage individual preference to enter into the selection of furniture for appearances' sake rather than for the more commonplace reason that "furniture is a necessity."

Moderne furniture, owing to its very striking design, often requires a complete redecoration and entire refurnishing of the room, even to the smallest detail. It is difficult to use only a few pieces of this new mode and combine them harmoniously with old furnishings.

Selection of Sales-Appeal Finishes

With the variety of finishes available today, finishing standards have been raised to a high plane of excellence. The selection of finish requires as much if not more attention, judgment and foresight as does the choice of any other material incorporated in the manufactured product.

An attractive finish, like excellent advertising, helps wonderfully in the sale of modern merchandise. A finish, carefully selected and properly applied, adds that extra incentive that clinches

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LACQUERS
and
ENAMELS
Suitable for
Spraying
Brushing
Dipping
on
Wood
Metal
Glass
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Prices Reasonable

Walker Service with Walker Lacquers

HENRY V. WALKER CO.
17 John St. New York

the sale when, as in a great number of cases, the prospective buyer's decision rests largely with the impressions he gets from the product's outward appearance. The finish is the point of contact with the buyer's eye.

High-grade material, wisely selected for appropriate and attractive effects and skillfully applied under suitable conditions, will produce the desired effect in quality of finish. The manufacturer's sales organization, the retail dealers and the dealers' customers all have greater respect for such a well finished product.

Lighter Finishes in Vogue Again

Never a time like today, when finishes have so much to do with the sale of furniture! The finisher who is going along finishing the same as he did a year ago will find that he is out of date.

For several years the craze was for a lot of high-lighting and heavy shading. Today I notice furniture buyers are coming back and demanding light finishes on the order of the French walnut which was the craze a few years ago—but instead of using only walnut there are a lot of fancy woods introduced and these are finished with a very light shading to reveal and emphasize the beauty of the wood. Carvings and mouldings are usually decorated with a little subdued gold or silver.—F. T.

Prefers All-Metal Interchangeable Turntables

In spray finishing I prefer all-metal turntables to those made partly or entirely of wood. Metal can be easily cleaned by suspending it in a chemical cleaning solution. I believe there is a market

for a turntable and stand that can be easily taken apart for cleaning and be quickly put back together for use. Such a device could have a stand patterned after a music stand or rack, but it should be made much heavier and more substantial, and should be fitted with a top that would turn on a pivot. The top should be made so it could be lifted off easily, and also constructed in such a way (for example with slots and bolt holes) that special racks of various shapes could be attached as desired for various kinds and sizes of work to be sprayed.—M.V.L.

"Shipper's Handy Helper"

The Diagraph Stencil Machine Corp., (stencil cutting machines & shipping room supplies) 2915 Clark Ave., St. Louis, Mo., has ready for distribution a new catalog, "Shipper's Handy Helper." It contains helpful information for both foreign and domestic shipping and lists nearly 100 shipping room items. It has 48 pages, 6x9-in., in size and is of unusual design.

Exhibit at Clean-Up & Paint-Up Headquarters

Outstanding exhibits of the recent Clean Up and Paint Up campaign are displayed at the headquarters of this organization's Campaign Bureau, 310 E. 45th St., New York City. These exhibits have been loaned for this purpose by Chambers of Commerce and Boards of Education throughout the country for display for a limited period.

Chaddick Heads New Binks' Baltimore Branch

H. H. Chaddick has been appointed Branch Manager of the new Binks Mfg. Co's. Branch Office located at 3801 Ridgewood Ave., Baltimore, Md. The new branch (Phone Liberty 5852) will carry a reasonable stock of equipment to facilitate prompt service for this vicinity.

A real finisher that FINISHES!

ECONOMY DeLUXE SPRAYER

Perfectly balanced, non-tiring, strong, serviceable AND light in weight, (2 lbs.).

A real find for the finishing room!

Designed for suction, gravity or pressure feed.

Soft, uniform spray of lacquers, that leaves a beautiful finish.

There are many good reasons for the popularity of ECONOMY Sprayers.

Coupon or letter will bring descriptive literature and prices.

ECONOMY MACHINE PRODUCTS CO., 5214 Lawrence Avenue, (Jefferson Sta.), Chicago, Illinois.

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CLASSIFIED ADVERTISING

Advertisements under this heading 45 cents a line per insertion, minimum charge, $1.35. In estimating, calculate six words to one line, and add one additional line for heading. Use this department to obtain help, find positions, buy and sell equipment, dispose of manufacturing properties, etc.

INDUSTRIAL SALES MANAGER

Desires to make change. Have had several years' experience in the selling of lacquers and varnishes to the industrial trade. Address IF-291, care Industrial Finishing.

INDUSTRIAL SALESMEN

Desires to make change. Have had several years' experience in the selling of lacquers and varnishes to the industrial trade. Address IF-306, care Industrial Finishing.

MANUFACTURERS AGENTS WANTED

—to supervise our sales of spray painting equipment in your territory and increase volume by adding automotive, paint and hardware jobber and dealer accounts. Our line sells easily—at a good profit. The line is perfected . . .meets competition point for point and dollar for dollar. Backed by an old established and financially responsible organization . . . and steady, persistent advertising and merchandising support. Here is a real money-making connection for manufacturers agents who want something that will build year after year. For full particulars, Address "MANUFACTURER," 332 Western Pacific Bldg., Los Angeles, Calif.

ADDRESSES WANTED

We have important mail for Mr. W. R. Beutin and Mr. C. F. Scribner, both formerly of Chicago.—The Editor.

EXPERIENCED INDUSTRIAL SALESMEN

For State of Connecticut and for Philadelphia and vicinity wanted by a well known manufacturer of lacquers, varnishes, paints, enamels and japans. Unusual opportunities for men who have had previous experience selling production finishes to the Industrial Trade. State experience and territory you now work together with drawing account expected. Give complete information which will be treated strictly confidential. You may feel free to write as our salesmen know of these openings. Address IF-305, care Industrial Finishing.

PAINT SALESMEN

Carry sideline of Shellac Varnishes on commission basis. Write us, giving territory covered, class of trade you call on, etc. Address IF-303, care Industrial Finishing.

FOREMAN OR GENERAL FOREMAN

Desires to make a change. Age 36. Twelve years' experience in automobile industry in charge of paint and lacquer. Well versed on modern methods of production. Would consider job as assistant or position as demonstrator or trouble man for paint company. Address IF-304, care Industrial Finishing.

REPRESENTATIVE WANTED

A progressive high-grade Eastern lacquer house desires a representative in Boston and vicinity who can efficiently sell and service quality products for metal and wood industries. Territory partly developed through advertising. Excellent future for right man. Address IF-307, care Industrial Finishing.

POSITION WANTED

As foreman auto painting, body repairing, etc. Address IF-308, care Industrial Finishing.

SALESMEN WANTED

A well known manufacturer, of a complete quality line of Fillers, Stains, Lacquers, Shellac, etc., with plants in South East and Middle West, has an opening for industrial salesmen, for New England States, N. Y., Pa., Ohio, No. and So. Car., Mich., and Ky. We want capable aggressive salesmen, with a broad knowledge of this line, the ability to demonstrate, and, above all, a following in the industrial field. Applications must contain complete business history, and record of past performance, age, qualifications, etc. Remuneration will be in keeping with your ability to produce. Our organization has been advised regarding this ad. All information held in strict confidence. Address IF-309, care Industrial Finishing.